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JULY 1950

BUSINESS · ENGINEERING · INDUSTRY

POINT 4 IN OPERATION

Aramco in Saudi Arabia — p17

HOW U.S. DOLLARS BROUGHT INDUSTRY TO DESERT AREA

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STYRON

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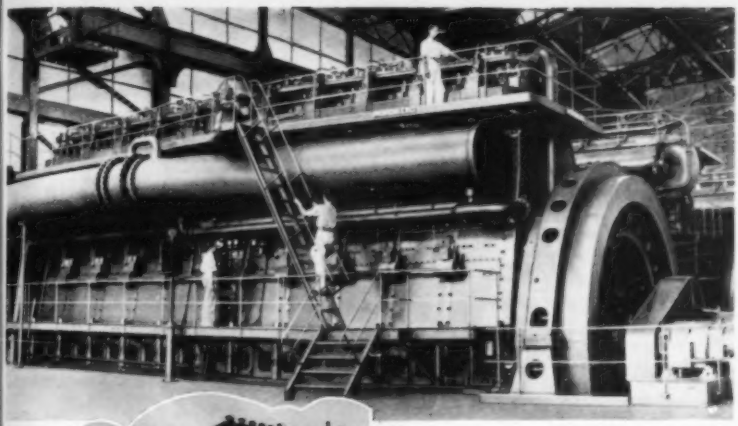

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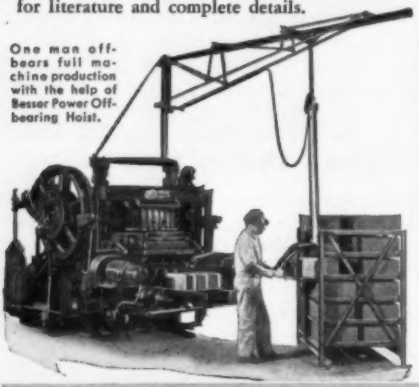

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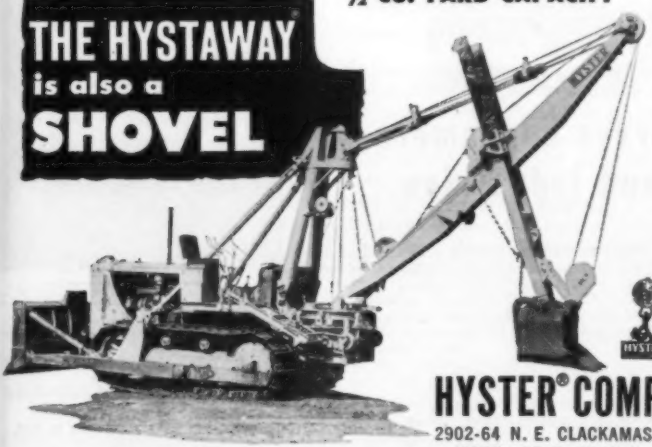

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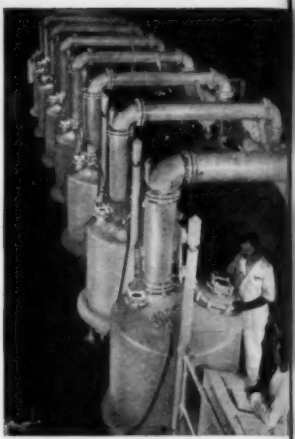

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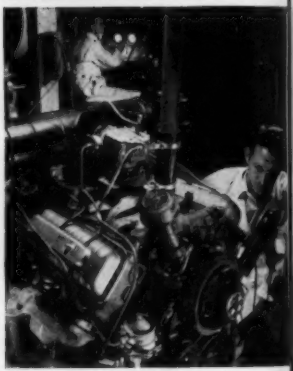

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REPRESENTATIVES THROUGHOUT THE WORLD

Business Trends

U. S. PRICES are edging upward. Continuing high business activity, easy credit, and mounting labor costs have contributed to the reversal of the downward drift of prices prevalent in the past year. No sharp rise in the price of any important commodity group is foreseen. But more prices will move up than down in the second half of the year.

The general price picture: Most raw materials will move up. So will semi-manufactured goods and machinery. But competitive pressure will keep the prices of consumers' goods at a steady level. Some further price cuts—in television and automobiles, for instance—are probable.

Labor costs will increase slightly. There will be some wage increases in small factories. Pensions will still be the main demand of labor in the big plants. Increased productivity of labor will compensate for some of the wage increases, but even so, with costs up and finished-product prices steady, profits will be lower.

Prices picture may change rapidly if the present boom is interrupted. Most price predictions are based on the assumption of continuing good business. But even a slight slowdown in the productive pace may send prices down. In the field of housing, for instance, it seems that rising construction prices may delay new building projects; this in turn may swing costs downward, especially if buyers' resistance to increasing prices mounts to any extent.

Here is a roundup of some important import commodities:

- **Non-ferrous metals** will continue strong throughout the year. Expected slowdown of strategic-material stockpiling will prevent further major price increases. But copper, in spite of its present high level, is expected to go still higher.
- **Chemical wood pulp prices** are expected to increase quite substantially in the third and fourth quarter of the year. At present, selling prices are above contract prices. New contracts will be made at higher level.
- **Coffee down—cocoa up.** After the spectacular increase in price, coffee has turned down again. Santos D might decline to 40¢ by the third quarter of the year. But cocoa prices, in spite of the recent sharp rise, are expected to go even higher.
- **Jute and burlap** seem to have passed their peak. Heavy burlap is expected to go down to 12 or 14¢ when India unfreezes the price. Wool will go up in the third quarter, steady thereafter.
- **Foreign consumers' goods** will run into some heavy domestic competition on the U. S. market. Such items as leather goods, linens, and laces will have to go down in price to find customers.

Prices of U. S. machine tools will increase. Price hikes averaging 10% are expected for early fall. Reason for the change: steel prices and cost of labor are

Business Trends (Continued)

up. And demand is so strong that sales of machine tools will not go down much if prices are increased moderately.

The rubber industry presents a confusing picture. Natural rubber prices will not decline by much as long as rubber is in short supply. And U. S. tire prices will have to increase on the domestic market. But on foreign markets, the U. S. tire industry faces such a stiff competition that no price increases are foreseen. Ultimately, U. S. synthetic rubber production will be stepped up enough to force a decline in natural rubber prices.

The textile outlook is good. High level of activity will keep prices up in the industry. Cotton goods are especially strong, though some price decline toward year's end cannot be ruled out. Rayon prices also will be steady.

Chemical market continues strong. Chemicals based on copper, lead and zinc follow the non-ferrous metals price trend and can be expected to rise. Insecticides are in short supply and there is no incentive to cut prices. But penicillin and streptomycin because of competition will move downward.

Petroleum products enjoy a minor boom—and prices are rising. The industry feels that demand will continue strong and some further price increases are quite likely.

Fat and oil prices are headed down. Steady supply, large stocks, and diminished demand (both foreign and domestic) are the key to the price change.

Edible-oil prices are expected to drop sharply. Domestic production will be within 5% of last year's. Domestic demand is rising a little, but exports will drop some 30%. Heavy pork slaughter also is expected this fall.

Drying oils also will decline. The government lowered its support prices on flaxseed; linseed oil is expected to follow the price drop. By late summer, linseed oil may possibly decline to 12½¢ per pound. Prices on oils for soapmaking are undermined by the growth of soapless detergents. Sales of these "soapless soaps" run at present at an annual rate of 1-billion pounds.

MARSHALL-PLAN AID for the year 1950-1951 has been mapped out. The pattern is very similar to the 1949-50 scheme, with most appropriations cut about a third. Some notable exceptions: The appropriation for Western Germany has been increased—from $348-million to $529-million—in accordance with the program of speeded-up rehabilitation. The share of the Netherlands has been cut substantially—to $185-million from $309-million. In 1949-1950, aid to Indonesia was included in the amount allocated to the Netherlands.

How will the Marshall-Plan dollars be spent? Over 70% ($1,700-million) will be spent directly on U. S. goods. The rest will be spent in other countries and will increase their dollar resources. Canada will get $260-million spent there, Latin America $200-million, and participating countries $67-million.

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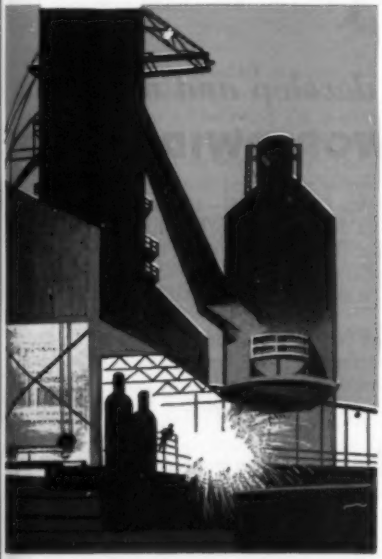

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Washington Report

THE LONDON CONFERENCES tied the U. S. to Europe closer than ever before in its history. U. S. commitment to a collective military defense of Western Europe is only the first step. Of far greater importance are U. S. economic commitments, which now are only vague ideas.

First decisions to come out of London involved financing of Western defense strategy. That means increased U. S. arms aid to Europe next year. A $1¼-billion is being mentioned.

Long-range economic decisions—involving post-Marshall Plan aid to Europe—will be slower in coming. But these are most important. What the Europeans want is security from the steep cycle of boom and bust that used to characterize capitalist economies. That is the Communists' strongest weapon.

STATE DEPARTMENT is about ready now to handle Point-Four project requests from abroad. It will review requests, decide which are practical, and whether other ways of financing are available. Then the work will be subcontracted to other government departments, which will supply the technicians. State Dept. plans to add technical cooperation officers to several U. S. embassies around the world to provide on-the-spot administration.

Congress reluctantly voted $35-million to the administration for the first year of Point Four. About $10-million will go to the United Nations' technical assistance program. Another $10-million is earmarked for agencies already doing Point-Four work—mostly in Latin America. State considers this sum only a bare minimum needed to get the program started. Larger appropriations are in store when the State Dept. finds out the volume of suitable projects it will be called on to finance.

BUSINESS REACTION to the Torquay Tariff Conference, scheduled for September 28, has been lighter than administration officials expected. Public hearings at the Tariff Commission drew some 400 business and labor protests against possible tariff cuts. This is well under the number that appeared before the Geneva talks in 1947.

Chemical producers are most worried about their protection. This is because Germany at Torquay will be represented in trade talks for the first time since the U. S. Reciprocal Trade Program was adopted. Germany is considered the major world exporter of a long list of chemicals. U. S. tariffs on these items are still at the relatively high levels that were established under the Hawley-Smoot Tariff Act of 1930.

Complaints from textile interests were only about half what they were before the Geneva talks. Yet the Torquay list is almost as broad as the Geneva list

Washington Report (Continued)

was. Some officials see in this a sign of weakening opposition from a usually formidable protectionist group.

U. S. negotiators at Torquay are sure to get more leeway—thanks to the light protest. While anti-import talk in Congress has been fairly heavy lately, it is coming mostly from traditionally protectionist groups—metals, glassware and pottery, leather goods, fish, and farm products.

EXPORT-IMPORT BANK'S $125-million credit to pay off Argentina's backlog of debts to U. S. exporters has succeeded in raising Peron's credit standing in private financial quarters. National City Bank and First of Boston are ready to advance a further $75-million—mostly to buy U. S. farm equipment. The Export-Import Bank credit relieved both of these banks of considerable commercial arrearages.

JAPANESE PEACE SETTLEMENT is just beginning to take shape. The U. S. has finally completed a draft treaty. As expected, the U. S. taxpayer will be paying Japan's security costs for some time to come.

Security costs are about all that is preventing Japan from paying its way in the world now. The annual U. S. subsidy to Japan is almost equal to the money the Japanese have to pay to quarter the 120,000 troops of General MacArthur's command. MacArthur's idea is to build a Japanese security force, confine U. S. participation to a few military bases leased over a long term.

Japan will have to take a sizeable cut in its prewar standard of living. Japanese foreign trade is only a tenth of prewar volume; big item, textiles, is down to a third of prewar. Efforts to expand Japan's trade have met very little success so far. Chief reason is that Britain and other Commonwealth nations are openly discriminating against Japanese goods.

DON'T LOOK FOR more trade between Communist China and the West in the near future. The British gambled on recognition of Mao Tse-Tung's government on the prospect of a thriving trade. So far, they have lost. U. S. authorities in Japan have made no progress at all in their efforts to get a trade act with Manchurian authorities.

The machinery that made prewar trading along the China coast a thriving business is rapidly disappearing. The Shanghai Pilots Association has been dissolved. Pilots are also pulling out of Tientsin. Most officials of the old Chinese customs service have been fired or quit.

Communist state traders now monopolize virtually all Chinese exports. They have succeeded in pricing themselves out of the world market. Indications are that rather than make the necessary concession to get Western business, they will turn even more to Russia and economic isolation.

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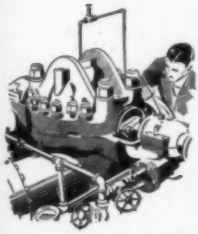

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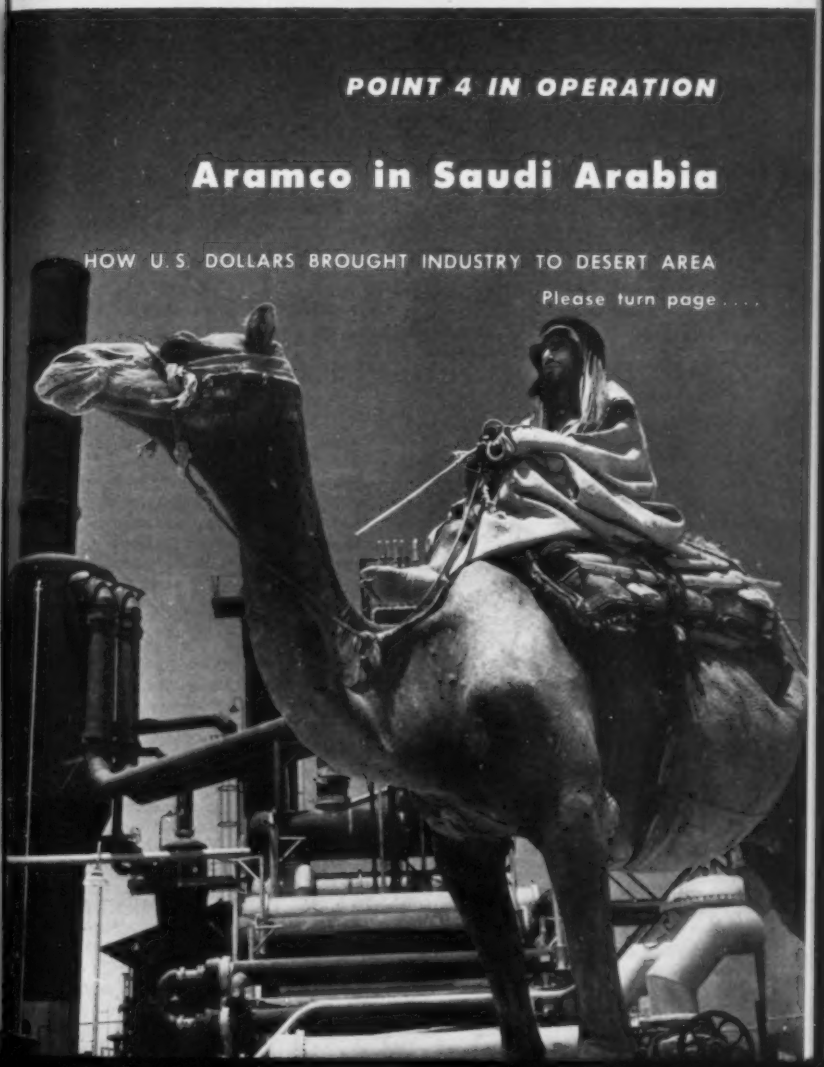


POINT 4 IN OPERATION

Aramco in Saudi Arabia

HOW U. S. DOLLARS BROUGHT INDUSTRY TO DESERT AREA

Please turn page . . . .

OPEN AIR MARKET place at Hofuf contrasts sharply with . . .

U.S. Know-How Changed Country's Face . . .

OLDTIMERS with Arabian American Oil Co. like to tell of the arrival of the first wheelbarrow into Saudi Arabia. Two Arabs picked up the wheelbarrow and carried it down the pier. That was 17 years ago.

Since then, Arabs have learned not only to push—not carry—wheelbarrows but have learned to drive monstrous trucks and tractors, maintain these vehicles, operate oil-drilling rigs, run chemical tests, write and type letters and business forms, run hospital equipment. All this has been learned from Aramco and Aramco technicians.

Preceeded Point 4

Aramco's operation in Saudi Arabia has many implications of President Truman's Point 4 policy for industrialization of under-developed countries. Although the Aramco operation in Saudi Arabia was a going proposition long before Point 4 was suggested, it has done much that it is hoped Point 4 will do.

It has brought industry to an under-developed country. It has taught the natives new trades, new ways of making a livelihood. It has, through royalties paid to the Saudi Arab government, made possible such projects as a national railroad, agricultural stations, a highway system, better school facilities, sanitation and hospital facilities . . . all aimed at a better life for the Saudi Arabian.

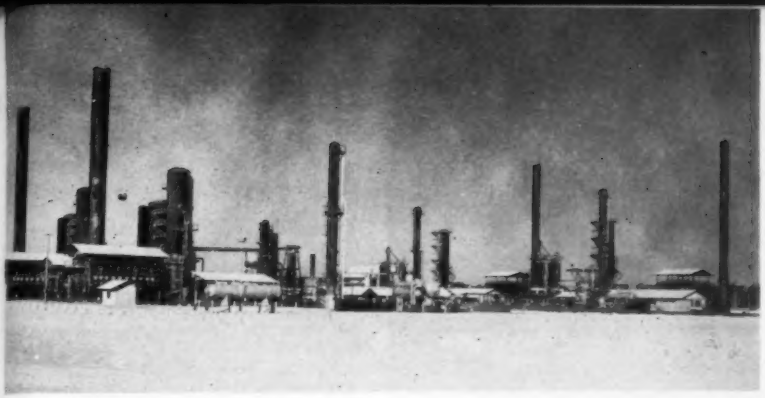
Operation Dates to 1933

Aramco dates back to 1933 in Saudi Arabia, when Standard Oil of California gained exploratory and development rights to 440,000 square miles of desert. (Aramco today is owned 30% by Standard of Calif., 30% by Texas Co., 30% by Standard of N. J., and 10% by Socony-Vacuum.) For oil produced, Aramco pays the Government of King Abdul Aziz Ibn Saud 22¼ cents per barrel.

The first 5 years Aramco was in Saudi Arabia were spent in exploratory drilling. Finally, in May 1933 the first well was brought in. The first tanker was loaded out a year later. Three months after the first shipload of oil left, World War II began.

The first few years in Saudi Arabia were difficult years for American Oil.

FRONT COVER—A Saudi Arab Bedouin and two children of Aramco American employees—a contrast of the very old and the very new at Ras Tanura, Saudi Arabia



. . . ***STILL TOWERS** of the Ras Tanura oil refinery*

Helped Economy . . . Developed Industries

Today, Aramco's operation is conducted in modern offices and plants. Resident engineers as well as native employees live in modern houses or dormatories. With its nerve center at Dhahran, on the Persian Gulf, Aramco's operation is much as it would be if the wells were in Oklahoma or Venezuela.

In 1949, production of crude petroleum was in excess of 22,820,000,000 barrels. This is a gain of roughly 4-billion barrels over 1948 production. Exploratory and development work is continuing, 11 new wells having been drilled in the Abqaiq area during the year.

In addition to the petroleum, over 20,000 cu. ft. of natural gas was saved and sold during the year. On this too a royalty was paid to the government. Gravity meter surveys of the marine shale area from Ras el Misha'ab to Ras Tanura was completed during 1949.

Personnel 60% Saudi Arab

In 1944 Aramco began a large construction program to expand handling facilities from 21,000 to 500.000 barrels per day. By early 1949, the 500.000 barrel-per-day production quota had been reached. Since that time the personnel has been reduced to fit the daily production figure. At the close of 1948, the total personnel employed by Aramco was 20,254, just over 60% being Saudi Arabs. By the end of 1949, Saudi Arabs totalled 62.3% of the employees, although the over-all personnel had dropped to 10,026. Reduction was due to completion of the expansion program.

The 10,000 employees are broken down 62.3% Saudi Arabs, 18.5% Americans, and 19.2% others, including Sudanese, Indians, Italians, Palestinians, Egyptians, Pakistanis, and Adenese.

Faithful Arab Employees

Training of native employees is emphasized by Aramco. During the past year 4,333 merit increases and 3,593 reclassifications to higher job classifications were granted to employees. Saudi Arabs, once in the employ of Aramco, tend to remain as witnessed by six who have been with the company for over 15 years, more than 500 for over 10 years, and 2,200 for over five.

Another indication of training, and its success, is the drop in the industrial injury frequency rate, cut to a quarter in the past year. This rate of 11.1 is below

SAUDI ARAB EMPLOYEE reads the control panel at the Ras Tanura refinery, noting readings in the company log

that of the petroleum industry in the United States.

Medical facilities have been built by Aramco. Doctors and nurses are still, in the main, American. There are Indian women doctors for female Saudi Arab patients. Saudi Arabs are employed in the hospitals and are continually being trained in the most technical phases.

Sanitation and disease control have long been needed in the area. Aramco employs a staff of entomologists, sanitary engineers, and other technical personnel, available at all times to the government. Elimination of endemic diseases is one of the primary tasks of this staff.

Malaria Nearly Gone

Typical of their success has been the literal eradication of malaria. In 1947, over 2,000 cases were reported. Last year, less than 100 were reported. DDT spraying projects, started by the company, have been continued by the government.

Company Conducts Special Services For Government

Disease is always high in under-developed countries. Aramco had to fight malaria, malnutrition, and venereal disease. It became a problem of curing not only the Aramco employee but also his family.

Special services are conducted by Aramco for the Saudi Arab government. These include agricultural projects, railroad construction, port facilities. All projects are done with money received by the government as royalties, but are done under the technical supervision of Aramco personnel.

Agricultural Projects—Saudi Arabia is slowly reaching the verdant greenness of the Biblical Garden of Eden. Land that once produced only dates and scrub grasses now produces 14 crops annually. It is the outgrowth of 5 year's work in agricultural experimentation with seed, fertilizers, and irrigation. In 1945, two American agricultural missionaires set up at Al Kharj an agricultural experiment station. King Ibn Saud was so enthusiastic about their results that he asked Aramco to hire agricultural technicians to broaden the scope of the Al Kharj station.

In 5 years the four experiment stations have taught Saudi Arabs modern farming methods . . . the advantages of good seeds (crosses between American seed and the acclimatized Arabian seed), fertilizer, and proper irrigation. It will not be long before the entire country (it's the size of the United States west to the Mississippi River) will be self-sufficient in wheat. Sufficiency in rice is not too far away.

Self-sufficiency in food-stuffs will be a boon to the 3 to 6-million peoples there.

Since the bulk of the population are Bedouins, no one has been able to take an accurate census.

Al Kharj is a 3,000-acre oasis that serves as the main demonstration area. Three harvests are made every month of the year for tomatoes, carrots, egg plant, onions, okra. Alfalfa must be cut every 2 weeks during the summer. Wheat is harvested 60 days after sowing.

Mechanical Agriculture

Harvests and sowing is done mechanically on the experimental farms. The stations are continually asked by native farmers for advice, to visit their farms (1 acre being average, 10 being large), and lend mechanical equipment. Natives, who 5 years ago cultivated their land with a sickle, now plow a straight furrow by tractor and plow.

The increased food production and the increased variety will have a beneficial effect on the natives' health.

Railroad Construction—Being rushed to completion is a railroad to link the Persian Gulf city of Damman to the capital city of Rijadh in the interior. Less than 100 American engineers and over 400 native laborers are on the job. The road will cost about $50-million, earned from oil royalties.

Although Aramco will be the major user of the road, the rail link will provide service to 1,500,000 peoples. It is expected to be an important link between the agricultural regions being developed in the interior with the more populated coastal region.

Port Facilities—Construction at the port of Damman is nearing completion. Work is Aramco-supervised. Again the oil company will be the chief user of the facilities. A well equipped port, however, is necessary for a country's economy.

Government offices in Jeddah and Damman have been linked by telephone and telegraph lines. Buildings, built for and by Aramco, have been turned over to the government permanently.

Along with its petroleum prospecting, Aramco has conducted hydrological surveys for the government. Many well sites and irrigation systems have resulted.

Encourage Employees To Quit

Aramco has developed an interesting philosophy toward its employees with native business acumen. The company encourages native employees with a native business or engineering bent to leave Aramco's employ and go into business for themselves.

The houses shown under construction (below) are being built under contract

***ARAMCO HOUSING** is constructed by native contractors. Aramco encourages good employees to leave company and set up their own businesses*

Point 4 To Bring Social Problems; Met By Aramco

by native contractors. During the past year, Aramco let 331 contracts to Saudi Arab businesses, businesses that did not exist 15 years ago. Value of contracts to Saudi Arabs totalled 12,000,000 Saudi Riyals (4–4¼ per $1).

The contracts covered such varied work as: building, tank, pier, and wall construction; installation of sewers, water lines, electric lines, plumbing; excavation; rock quarrying; gardening and landscaping; block, brick, and lime manufacturing; vehicle maintenance; marine repairs; operation of camp facilities for traveling survey parties.

A SAUDI-ARAB prepares to X-ray a fellow employee at the Ras Tanura hospital, built by the company

Problems for Both Sides

Entrance of American capital and industry into under-developed countries will always be a delicate problem in compromise—both for the American company and the country involved. Wherever Point 4 aid goes, these problems will be met.

Since 1933 Aramco has conducted its operation on the basis that it is a guest of King Ibn Saud. The Arabs are partners in work—not slaves.

The native-labor problem was great for Aramco. Not only was the population untrained technically, but in the main it was illiterate. Training had to be started on an elementary level for young Saudi Arabs. Government-sponsored elementary schools have been increased, and schooling, so far as Aramco is concerned, now is in technical fields only.

Schooling and training are not soley for Saudi Arabians either. The company maintains a school in the U. S. where all Aramco personnel destined for Saudi Arabia must study. For 6 weeks of intensive training, oil-well riggers, geologists, chemists, and engineers study Arabic history, religion, customs, and language. Faculty is Arabic, selected from the company's field employees. The company firmly believes that if its workers understand the Arab, mistakes that have been embarrassing to American business overseas can be avoided.

When the American leaves the school, he has learned about 1,000 Arabic words, enough for work-day conversation, and enough written Arabic to keep from being lost in the desert.

Aramco has found customs, laws, practices new to Americans in Saudi Arabia. It has been the Americans who have had to change their ways.

Currently Arabian American Oil Co. is interested in promoting interest of other industries in Saudi-Arabia. There is ample room and resources. The native has proved adaptable, quick to learn. The country has been, and is, a good proving ground for Point 4.

Postwar Power-Plant Design

Since the war power plants have seen many changes in their design—some to cut costs, others to better performance. Here are major trends summarized

A SURVEY made by *Electrical World* of 81 postwar power plants reveals that certain distinctive design features predominate. These features—the result of ingenuity and pioneering—have been incorporated to reduce construction costs, improve performance, minimize operating staffs, centralize controls.

Completely outdoor plants number only four, but many more have varying degrees of outdoor construction. Six plants have a canopy over the firing aisle for outdoor boilers. Some plants house units on the roof.

Structurally, efforts have been made to supplant high-cost brick walls with lighter, cheaper materials. Specific design features include:

1 Fuel handling has emphasized the use of conventional or modified earth-moving equipment. Coal is fuel in 50 of the 81 plants. Belt conveyors in 23 plants move coal to crushers.

2 Remote control of circulating pumps located at the screen well is an increasing practice—now in 29 plants. Condensing water is chlorinated for slime control in 54 plants.

3 Condensers are being chosen to permit cleaning. Divided water boxes or two-pass designs are popular. Deaeration in condenser hot well prevails in over half the plants.

4 More plants have dust collectors. Mechanical types predominate over electric. Retractable soot blowers are installed in 51 plants, and dustless unloaders to condition flyash in 16.

5 Reheat is on the increase, except where superior reliability calls for boiler headers. It was adopted for 9 plants and will be the cycle in 7 more in subsequent units.

6 One boiler per turbine is the predominant pattern as reported for 60 plants. Presence of prior units frequently results in adoption of three of four boilers for a pair of turbines with headers to couple them. Radiant-tube boilers are in 36 plants.

7 Induced-draft fans are often outdoors. Thirty-five plants use two forced-draft and two induced-draft fans per boiler. Fans are sized for one-third overload on turbines in 42 cases.

8 Hydrogen cooling remains mostly at 15 psi., but trends toward 25-30 psi. Correspondingly universal is the dependence on temperature detectors in the stator coils (79 plants). Condensate cools the hydrogen in 25 plants.

9 Direct connection of alternators to outgoing transformers eliminates generator bus in 48 plants. Effort was made to keep generator leads short in 35 plants. Isolated phase design prevails in 31 cases.

10 Exciters are usually (60 plants) direct-connected mechanically. Eleven have only the main exciter on the unit shaft. Rheostatic exciter field regulation is in effect at 27 plants. One plant reports electronic rectifiers fed from a shaft generator, automatic anode breakers, ignitron regulation.

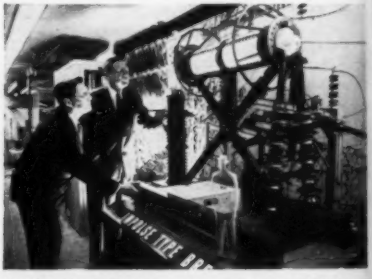
11 More than half the new plants have centralized plant controls with operators able to see the turbines. Fourteen use benchboards for mechanical controls, 37 house operating room between turbines and boilers.—Elec World, May 8, p88

EXHIBIT STREAMLINER is General Electric Co.'s answer to modern sales promotion. It will be hauled by Alco-GE diesel-electric locomotive to the whistle stops of industry.

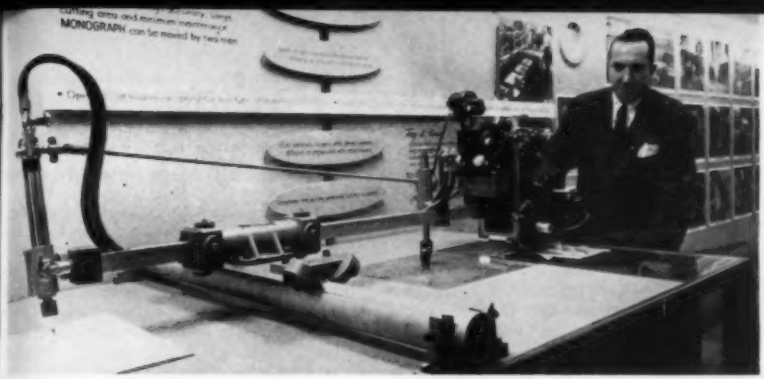
Ten-Car Sample Kit Tours U.S.

Rolling the rails in America is the biggest display kit ever built. Ten cars and ¼ mile long, the traveling sample case is General Electric Co.'s "More Power to America Special." First train of its kind in industrial history, it is carrying exhibits of more than 2,000 electrical products, systems, techniques. It is carrying them for just one purpose—to stimulate sales. The train will not be open to the general public, but only to those who produce electric power and those who put it to work. Here is what the "Special" covers: power generation, transmission, and distribution; drives and controls; materials handling; industrial lighting; components for industry; measurements; civic improvement; and national security. Even the locomotive itself is part of the display—an Alco-GE two-unit 4,500-hp. diesel-electric.

MANY EXHIBITS will be pushbutton-operated by visitors themselves. Buttons here operate street lighting luminaires.



IMPULSE TYPE breaker model is of 230-kv. unit. Colored lights show how 10-million kva. can be interrupted in 1/500 sec.

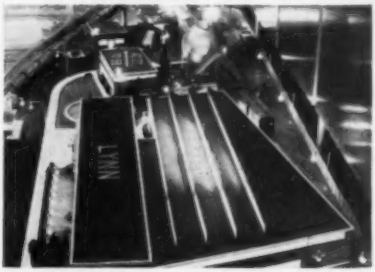


ELECTRONIC BLOODHOUND is the tag on this flame-cutting machine. Light beam following drawing of desired shape guides torch (here a ball-point pen) to outline same shape.

MOCKUP of 25-ton switching locomotive has operating controls that let visitors play railroad and operate model trains.

MEASUREMENT section of the Special carries hundreds of different precise instruments —even cutouts to show how they work.

ACTUAL TURBINE parts are in the foreground. Pushbuttons light up, in the background, sections where parts are located.



SCALE MODEL of properly illuminated factory area shows how each light has been correctly located for a specific job.

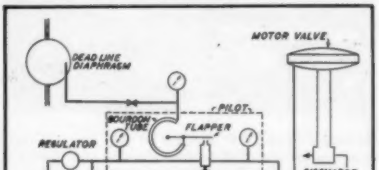
U.S. Mass-Market Packaging

Packages must be designed to sell themselves with little assistance from sales personnel. Materials and design must be to customers' benefit

VARIETY STORES in the United States—5¢ to $1 items—are good proving grounds for packaging methods. There, a package must sell itself with limited salesmanship. In the variety store, a clerk does little more than answer the customers' questions and take their money.

This type of limited salesmanship has spread from the variety stores in the U. S. to include drug stores, groceries, department stores, and hardware stores.

The variety store, years ago, coded prices and kept goods behind the counter. The situation has changed. Prices are clearly marked, and the products prominently displayed. The average U. S. variety store carries 25,000-30,000 items, probably 80% of the items being packaged and given open display.



DRILLING-BIT WEIGHT CONTROL

Drilling speed for oil wells is affected by weight on drilling bit. Bit weight is maintained automatically by this arrangement. Motor valve, which controls feed-off through Brantly unit, is air operated. Air on motor valve is controlled by letting air escape through orifice governed by flapper-type valve. Flapper is connected to bourdon tube to which hydraulic pressure is transmitted from weight indicator fitted on deadline. Lower deadline pull and higher bit weight pull flapper away from orifice, lets air escape, operates motor valve to restrict fluid flow from pump, thereby slowing descent rate of drill. —Oil & Gas J, Apr 27, p170

Open displays mean customer handling. Packages must be designed to take this frequent handling. Heavier-gage transparent wrappings and new transparent films reduce handling damage. Carded items—products displayed and sold on cardboard—are being attached to heavier board, making display easier, damage less frequent.

Better fastening of items to card has resulted in reduction in number of items that come loose and fall off. This trend is noticeable in hardwares, home furnishings, hair goods, notions.

Card design should take into consideration standard display areas and bins in stores. Bent or folded cards are unattractive on counters.

Wider use of trial shipments by chain organizations tests effectiveness of the package. And packagers are giving more thought to packaging design services to assure best color, pictorial treatment, lettering, and printing.

Well-planned, informative labeling gives greater brand prominence—the label telling what the package contains, what the product does, how to clean it. Designers are making packages in more convenient shapes and weights for customers to carry. In the past, packages were designed to fit the requirements of the retailer. More and more, emphasis is being placed on requirements of the customer.

Packages expected to sell themselves must be designed so women may pick them up easily with one hand. The other hand is usually encumbered with bag, gloves, and perhaps a child or two.

Attention must be given to the ease with which a package is opened. Heat-sealed cellophane bags are hard to open unless a pull-tab is provided. Tinned foods designed to be opened with a key—

such as sardines—are impossible if the key is missing. Key must be securely affixed to the can. One department store, selling identical tubes of household glue, found that the tube equipped with a dispenser opening that was easy to open and close outsold the other two to one.

Variety stores like prepackaged boxes with handles for easier carrying, especially for fragile items. Prepacks should be so designed as to require no wrapping on the part of the store.—Mod Packaging, Apr, p115

Modern, Compact Plant Bleaches Sulphate Pulp

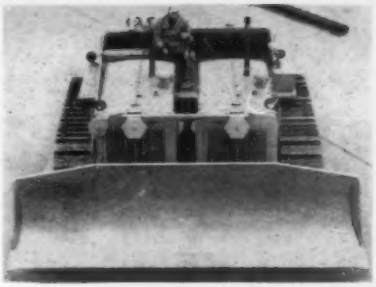
New bleaching plant of Frazer Cos., Ltd., at Edmundston, Canada, is designed for bleaching sulphate pulp at a rate of 120 tons of fiber per day. It carries out the usual functions of chlorination, extraction, brightness development, and brightness stabilization.

Chlorine is added to the pulped stock in the chlorinating tower. The stock then passes to three high-density stages. In the first tower, hypochlorite and caustic are added at the mixer; in the second, caustic; in the third, hypochlorite and caustic.

Stock is pumped to a decker-type washer and thicknener where it is thickened to 6% consistency, then to line mixer and low-density towers. In each of three towers, hypochlorite and caustic may be added for required brightness.

From the last tower, the stock is pumped to another washer, thickened to 3½%, passed through a line mixer into the base of a reaction tower. Here it is stabilized with SO_2. Stock overflowing from this tower is pumped to a washer, then flows to the screens.

Smythe flat screens do the final screening. Stock from the screens is pumped to three deckers, thickened to 4%, dropped into the storage chest, and there held until delivered to the paper mill.—Paper Ind, Apr, p41



COMBINATION GIVES 270 Db.-Hp.

Two Caterpillar D8 joined together by Peterson Tractor & Equipment Co. produces 270 drawbar-horsepower rating. After joining, one man controls unit for handling a 16-ft. wide, 5-ft. high bulldozer blade, a 30-yd. scraper without pusher assistance, or a heavy-duty rooter or ripper. Controls are operated separately except for a master clutch controlling both engines by one lever. The unit weighs 55,000 lb. and is 13½ ft. wide without bulldozer blade.—Eng News-Rec, Mar 30, p76

Openhearth Bath Temperature

Recent meeting of National Openhearth Steel Committee stressed temperature control of openhearth baths. A Bethlehem Steel engineer in discussing his company's use of platinum-rhodium thermocouples brought out that temperature control of the bath reduces ladle skulls and increases ingot mold life by 25%.

Bath temperature control, according to a Jones & Laughlin engineer, reduces mold stool stickers by 25% and graphite inserts give an 85% increase in stool life.

Wheeling Steel Corp. uses combination steel and cast-iron stools with cast-iron inserts about 12 in. thick. Practice is to cool molds and stools with water. Number of stickers declines when stool temperature drops to less than 100° F.

Another steel plant uses three types of stool washes and controls stickers by controlling pouring temperatures.—Steel, Mar 27, p84

JET HELICOPTER LIFTS DOUBLE LOAD

Two light pulsejet engines mounted on rotor tips replace piston engine in American Helicopter Co.'s new 'copter. It is being flight-tested for the U. S. Air Force. Claim is that it will lift twice the usual weight. Engines are light, maintenance easy. Overhauling pulsejet engine takes 5 min.—Business Wk, May 6, p48

Photography Saves Time in the Drafting Room

An experimental photographic department set up by Ingersoll-Rand Co. points the way to a workable step-by-step procedure to get better drafting results in less time, with less hand work, and without special, high-priced equipment.

The method under study and development is photographic reproduction—a positive copy directly from the original pencil drawing without an intermediate negative. A new photographic paper, which is called Autopositive paper and is made by Eastman Kodak Co., makes this possible. Autopositive cloth, a similar material, also is used.

To convert a pencil drawing on vellum to the equivalent of an ink drawing on cloth, Autopositive cloth is placed in contact with the original drawing. It is then exposed for a few seconds to a high-intensity light. This can be done on a blueprint or diazo machine or a modified vacuum frame.

A transparent yellow sheeting is placed between light source and original drawing to serve as a filter. After exposure, the cloth is given conventional photographic processing.

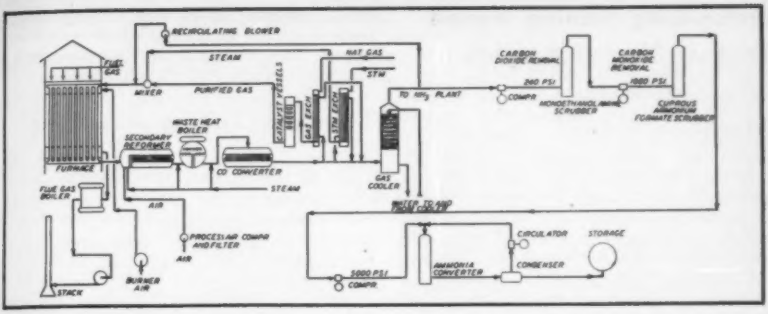
The positive reproductions may be either right-reading or reverse-reading, depending on whether the pencil lines of the original were in direct contact with the silver emulsion of the Autopositive cloth. For right-reading, lines are toward light source and away from the cloth.—Prod Eng, May, p135

Petroleum Coke for Cupolas

Petroleum coke makes a satisfactory cupola fuel for foundries. In some respects, it is proving superior to either beehive or by-product coke.

The coke is a residue from distillation of crude oil. It is used to some extent, either by itself or as part of the ordinary coke split, in cupola operations where extremely high temperature is necessary, such as when steel scrap forms the greater part of the charge.

A low ash and high carbon content makes it especially desirable. Naturally, its cost must be compared with that of regular coke.—Foundry, May, p146



***AMMONIA-SYNTHESIS** flow chart shows how to convert . . .*

Natural Gas for Fertilizer

A major producer of nitrogenous fertilizers is Phillips Chemical Co., a wholly owned subsidiary of Phillips Petroleum Co. Its process is a modification of the original German Haber-Bosch process.

Natural gas is the source of the hydrogen needed to make ammonia by reacting nitrogen and hydrogen. The ammonia is then further processed to ammonium sulphate or nitrate, which in turn is blended with phosphorus and potassium to make the fertilizer.

The natural gas is passed through a heat exchanger and over zinc oxide at 750° F. to remove hydrogen sulphide and mercaptan sulphur. Then it is mixed with steam and passed through stainless-steel furnace tubes containing nickel catalyst, then through a secondary reformer.

Product contains H_2, N_2, CH_4, and CO. Its temperature is lowered in a waste-heat boiler, then CO converts to CO_2. Reformed gas passes through a cooler, compressor, and to a monoethanolamine scrubber to remove CO_2.

The gas is again compressed, and CO is removed in a cuprous-ammonium-formate scrubber. The process gas now contains the hydrogen and nitrogen needed for ammonia synthesis, plus some inert gases. It is compressed to 5,000 psi. and reacted at 930° F. over an iron catalyst to form the ammonia, which then is condensed and stored until processed to sulphate or nitrate.—Oil & Gas J, May 4, p138

Three-Color Picture Tube

Color-television has been given even greater life by a new development by Radio Corp. of America—a three-color picture tube. The previous RCA system (McG-H Digest, Feb, p27) employed three picture tubes in the receiver.

The new tube uses 351,000 color dots; one third is red, one third blue, and the other third green. The color dots are arranged in triangular groups of three dissimilarly colored dots each.

Immediately behind the tube face is a metal mesh screen with 117,000 holes. As electron beam scans the tube face, electrons pass through the holes. Whether the beam falls on red, blue, or green portion of the groups is determined by information contained in the video signal.

The tube operates on 525-line definition, so receivers designed for use with the tube are compatible with black-and-white receivers; that is, present sets would receive color televised programs in black and white.—Electronics, May, p120

Piston-Ring Tooling Varied To Suit Size of Batches

As specialist manufacturers of pistons and piston rings, Wellworthy Piston Rings, Ltd., of Lymington, England, will supply any quantity—from one prototype to a running order to meet the requirements of a large automobile plant.

Annual production is 12-million rings. Batch sizes range from 1 to 5,000. All rings receive 100% inspection.

Production methods vary according to batch size. Keynote of the tooling is universality; work fixtures are designed to take a range of sizes, and adjustment is simple. On some tools the register plate may be changed, while many do not require changing of any parts as they are fitted with adjustable guide plates.

Variation in methods is well illustrated by those employed to chamfer inside edges of ground piston rings. Smallest lots are chamfered singly by holding a ring by hand against a conical grinding wheel.

Larger batches are machine-chamfered by placing each ring on a register against a magnetic faceplate and feeding in a grinding wheel set at an angle.

Still larger lots employ special machines. Rings are stacked in a horizontal trough and fed by an endplate. The first ring at the other end is fed to chamfering position by a lever-operated arm. Chamfering is done by two ring-shaped tools, each with four carbide-tipped teeth, that are fed into the work by cams.—Mach, Apr 22, p601

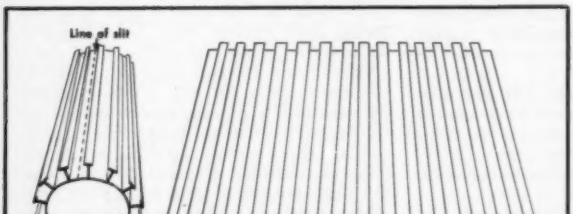
Titanium Tubing Available

Interest in titanium holds at a high level (McG-H Digest, Feb, p53). A titanium-alloy tubing is now on the market in a welded, drawn type that offers large size range, eventual lower cost, and more ready availability. Superior Tube Co. is the manufacturer.

Sizes of Weldrawn titanium tubing range from ¾ in. x 0.010-in. wall to 1¼ in. x 0.072-in. wall in annealed, half-hard, and hard-drawn tempers. Welding is done under a blanket of inert atmosphere that must be rigidly controlled for best physical properties of the weld area.—Iron Age, Apr 6, p85

Cleans Motors Centrifugally

Cleaning and flushing of gear cases of motors on demand and time switches are done on a centrifuge at Narragansett Electric Co. The centrifugal action throws out old oil and chips. It consists of a flat disk fitted snugly inside a cleaning machine basket. Gear cases are bolted to the disk. The devise can even be used on a lathe, drill press, or small motor by modifying the mounting.—Elec World, Apr 24, p116



EXTRUDED SHEET WITH STRENGTH

Added strength without added weight is provided by Reynolds Metals Co.'s extruded aluminum sheet. Extruded in tube form, extrusion is cut lengthwise and flattened. Result: a 28-in. wide sheet of aluminum with 14 T-shaped stiffeners. Product will be used in airframe industry. — Business Wk, Apr 29, p46

Squeezed Out Like Toothpaste

Concrete Roads Without Forms

Announcement of machine will make concrete secondary and tertiary roads competitive with asphalt. Test show great savings

CONCRETE HIGHWAYS are made competitive costwise with other materials with the announcement of Blaw-Knox Co.'s concrete laying unit. Designed for secondary and tertiary U. S. road construction, the unit lays down a ribbon of concrete at the rate of 10 fpm. without forms, special equipment, or special materials. The unit, which is still in the development stage, laid a 0.463-mi. test strip of 20-ft. wide highway in Iowa at a total cost of $7,921. The lowest bid using conventional concrete equipment for the test strip was $15,498.

Blaw-Knox hopes in 1951 to have two models in commercial production. One will lay a strip 10-15 ft. wide, The other will have a width of 20-25 ft. Wider strips are possible through use of multiple strips. In multiple strip work, one set of wheels rides on already completed lane. As the unit is entirely separate, no difficulties are encountered because forming device still rides on subgrade.

Small trapzoidal space remaining between the new and previously laid strip is filled with bitumen.

Unit is operated by one man. No provision is made for placement of steel reinforcing—hence its use on secondary and tertiary roads. Currently there is no provision for expansion strips but the company says they can be placed manually after forming or through modification of the machine.

Combining three operations into one, the machine is actually a spreader, a transverse finisher, and a longitudinal float. It consists of two separate units—a forming unit, which rests and rides on the subgrade, and a propelling unit. Spreader is moved by a link chain connection.

Forming unit consists of a hopper for concrete mix, vibrating units for compaction, slide forms to form vertical slides, sliding form to form top, a reciprocating belt acting as a transverse finisher.

Machine rounds curves easily, a projecting rod maintaining lateral align-

ment. Subgrade can be built up to meet state specifications.

Standard mixes are used, slabs having been built with mixes having 2-, 2½-, and 3-in. slumps. Standard or air-entrained mixes, delivered by transitmix trucks, can be used.

The company will not disclose its secret of why the slab holds its shape.—Eng News-Rec, May 11, p25

Continuous Ranges Used For Dyeing Synthetics

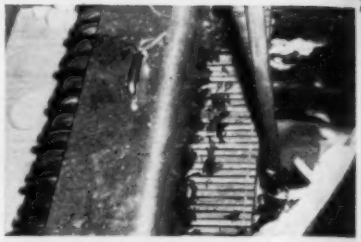
Pad-steam continuous ranges, long used to dye cottons, are being used successfully to dye synthetic fibers. New ranges handle fabrics without exerting undue tension. Ranges take little supervision. Unit for synthetics differs somewhat from a cotton range.

Range consists of two pads, a steamer unit, an oxidizing unit, and a washer-rope soaper section, all synchronized. First pad is a two-bowl, 120-gal. unit. Second is a three-bowl, 30-gal. unit. As goods leave the second pad, it enters steamer unit. From steamer it passes to a 200-gal. oxidizing unit containing sodium bichromate and acetic acid, formic acid, hydrogen or sodium peroxide. At 150-175° F. temperatures, goods are developed to shade, then enter washer-rope section. Compartments in the machine are there hotwash, three soapers, two hot rinses, and a cold wash.—Textile World, May, p105

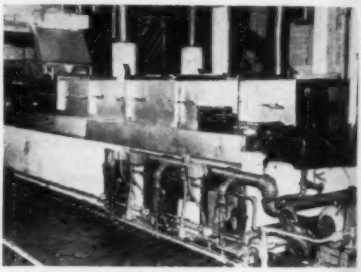
Space for Irregular Parts

Materials and parts needing special attention—reward, missing information, etc.—are pulled off the assembly line at American Machine & Foundry Co. and stored in a "waiting room." Line is no longer choked with idle work. Department heads check held-up work in bay at frequent intervals to expedite materials' return to production line.—Factory, May, p99

Frozen French Fries . . .



. . . at Birds Eye-Snider plant are made by washing, peeling, then feeding to this slicer that cuts potatoes to ½-in. strips. After inspection, potatoes . . .



. . . are blanched, then fried in this two-stage continuous cooker. Strips pass through hot oil in revolving baskets and on to . . .

. . . a cooling tunnel before delivery to filling machines. Cartons are finally conveyed to quick-freeze room.—Food Ind, May, p113 and 140

Dutch Consumer Dollar Fair Proves Successful in U. S.

Cooperation between Gimbel Bros., one of America's largest department stores, and the Netherlands Trade Commission brought to Gimbel's Philadelphia store a million-dollar display of Dutch manufacturers. Everything from diamonds to telescopes to toothpaste was displayed.

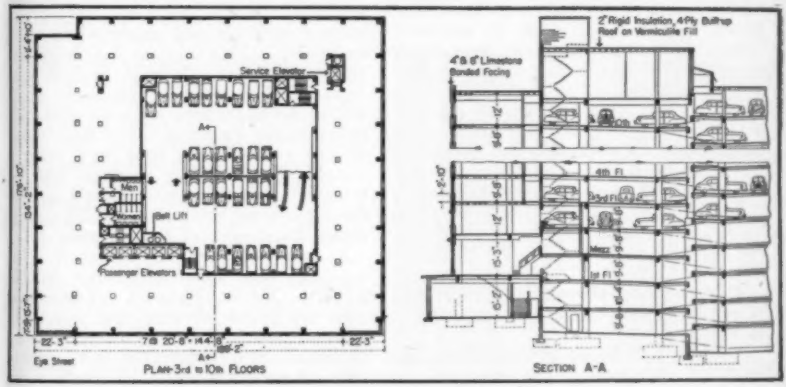
Gimbels made available 30,000 sq. ft. of floor space, 50 street-floor display windows, and quantities of advertising and promotional material. The first day the exhibition was open, 15,000 people came, looked, and bought. Dutch sales personnel handled the exhibits and sales. All money taken in went directly to the Netherlands Trade Commission to defray cost of the fair.

It was planned to tour the U. S. with the exhibition, but NTC decided to let the U. S. store buyers carry word of Dutch manufactures to other areas. Amsterdam has announced that another exhibition, to include restaurant and theater facilities, will tour the U. S. —Business Wk, May 13, p122

Meter Measures Hemoglobin

Hemoglobin determinations can be made accurately in 3 min. with a portable Hb meter developed by American Optical Co., Instrument Div. The Hb meter operates on the principles of a photometer, matching the color intensity of a split field.

Light coming to one side of the field passes through a hemolyzed blood sample. Light coming to other side passes through a wedge with permanent absorption characteristics. Movement of the wedge matches color intensity. Hemoglobin content is read from scale on housing.—Mod Plastics, May, p62



"PARK-AT-YOUR DESK" OFFICE BUILDING

Parking near the office will be no problem in Washington, D. C., for anyone whose office is in the 10-story Cafretz Building when it is completed. In fact, the tenant will park on the same floor as his office. About one-third of the 189x177-ft. building will be parking space. Office will be on the perimeter. Reasons for the design: (1) Even with air conditioning, tenants want windows. (2) Area used is least desirable—a light court would be a waste of expensive real estate. (3) Garage will not require finished floor, ceiling, or walls. (4) Basement and first floor are rental areas, an income that would be lost if a parking space was not otherwise provided.—Eng News-Rec, May 11, p45

How To Cut Costs Through Wage Incentives

A Good Plan Will Cut Costs

WARTIME PRODUCTION EXPERIENCE proved that even hastily conceived wage incentive plans could increase production per man-hour by as much as 40% in the first 3 months the plan was in operation. Take-home pay could rise 15–25% and unit costs could drop 10–15%.

This is the short-term experience. Unless the incentive is well planned, the advantages will soon be lost. Careless incentive planning will hurt management.

Properly designed and installed incentive programs should improve on the short-term figures by 35–50%. And more important, the benefits will last.

Wage-incentive programs often open management to the charge of "speedup." Fairly administered plans do not lend themselves to this charge by workers or unions. Planning for a wage-incentive program should not be kept secret from the employees. It should be explained in detail to them. Stress that the plan is based upon the following five points:

- The hourly rate is guaranteed and will be paid regardless of production.
- Rates, once set, will not be changed unless there is a change in methods, materials, or equipment used in the operation.
- Performance above normal effort will be rewarded with extra pay in proportion to extra production.
- There will be no limitation on the incentive earnings of the operator.
- Rates may be reconsidered through grievance procedure and will be revised if an error has been made in their establishment.

An incentive-wage program must have a specific objective. The objective should be to increase take-home pay 30–35% over similar shops in the area and bring output per man up to a fair day's work. To reach this objective the plan must be based on sound engineering practices and industrial relations.

Improvement in manufacturing techniques and product changes will necessitate thorough revision of the plan every 5 to 7 years. In only a form-ruling shop and a bindery have methods remained the same since 1926 to permit a plan instituted then to remain unchanged through 1949.

Basis for a Good Plan

Sound foundation for wage-incentive plans requires four things:

1. A working methods-improvement program. Shop methods should be studied carefully and improved as much as possible. This must be done when the plan is installed. It must be done continually after the plan has been instituted. An aggressive work-simplification program can be a big help. Rechecking will be necessary at least once every 3 years. Results from recheck will be better if it is done by someone outside the department being checked. This overcomes the danger of complacency.

2. A sound base-rate structure. Inequitable base rates will cause trouble quickly. Under day-work conditions it may not be too obvious that jobs have unequal pay. But once on incentive program, such differences are quickly seen. A good job-evaluation study is the best way to avoid such discrepancies.

3. Competent time-study men. Fair, accurate rate standards cannot be overstressed. Poor standard ruin many incentive programs.

4. Broadest possible use of standard data. Certain operations are common to more than one job. If job analysis is

competent, these common elements will show up.

There are at least half a dozen rating systems now being used to evolve standard data. On machine operations, volumes of standard data are available. There are four recognized systems for setting standards: work-factor analysis, methods-time measurement, motion-time analysis, elemental times.

Incentive-pay plans for direct or production workers fall into two broad categories: piece-rate plans and standard-time plans.

Piece-Rate Plans—Applied to individuals, piece-rate plans are as old as the textile and shoe industries. Under them, management pays the worker a definite amount for each unit produced. Piece rates can be applied to groups as well as to individual workers, if conditions are right. Group incentives must be used where a number of people cooperate in running a machine or group of machines and where the production of the end machine is the production of the group.

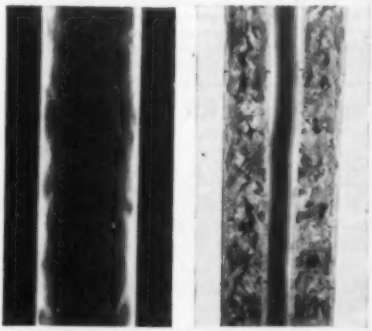
Piece rates do not, in general, put as much burden on management as is desirable. Employer is apt to think that unit costs are fixed. His direct costs are fixed. But indirect costs are not. If employees do not produce as much as possible, indirect costs may skyrocket.

Standard-Time Plans—Measurement of the job in units of time rather than in money is an important improvement over straight piece-rates. Standard time does not change unless the job changes. Standards are not distorted through wage changes.

Standard is set by time study of a qualified worker working at normal speeds under normal conditions. Bonus is based on the percentage above standard for the period. In most cases, bonus should be 1% of base for each 1% produced above base.

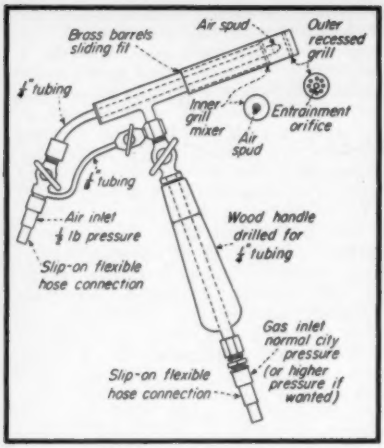
Measured-Day-Work Plans—These plans became popular during the depression. They compromised between a regular incentive plan and straight day-work for hourly wages. Hourly rates are graded for each job classification. A range is set for each job. Whether a worker's pay falls into that range is determined by whether he had produced his "measured" amount of work as well as by other normal merit-rating factors. Workers are rerated every 3 months. Complaint is that there is too much lapse between rerating and work accomplished.

Incentives must be applied to indirect as well as direct workers. Some indirect workers can be put on direct-measurement incentives just as production workers are—clerical, inspection, materials handling, maintenance employees. In other job categories, where it is difficult to make precise estimates of job times, split-premium plan is widely used when indirect jobs are on standard-time incentives. Some companies have found it possible to put as many as 80% of their maintenance employees on incentives through use of standard data.—Factory, May, p100



EXAMINES WATER PIPE

Recent maintenance inspection made by consulting firm Sam Tour & Co. was aided by radiography. Radium examination of pipe running from hot-water storage tank to riser showed uneven mottled pattern (left). Pipe removed and split (right) was found to have heavy deposit of rust and scale that nearly stopped water flow at 70-psi. pressure. —Iron Age, Apr 27, p98



SHOP-MADE GAS TORCH

Gas-air torch burns city gas with flame range from small "cool" needle jet to hot, fast needle flame or spreading flame as required. Uses: fine soldering as on connections, lugs, instrument stylus; softening window putty; tempering small parts; aluminum soldering.—Elec World, Mar 27, p124

Vapor-Dried RR Crossties

Vapor-dried railroad crossties have been under test by 11 U. S. railroads for various periods up to 6½ yr. and show marked decrease in checking compared to air-seasoned ties. Process should add 3 yr. service life to ties. Tests have been made on oak, hardwoods, and gum ties. Vapor-drying shortens seasoning period from months to hours.

Cycle now employed by Taylor-Colquitt Co. requires a 12–14 hr. drying period, a 2-hr. vacuum period, and 4 hr. for treating and final vacuum. Total time is 18–20 hr., depending on type of wood and moisture output.

Immediate annual savings through use of vapor-dried ties is estimated by one railroad as $45,000 for 600,000 ties.—Railway Engrg & Maint, May, p453

Prepolishing Before Forming Reduces Hand Polishing

Major cost element in manufacturing formed, plated steel parts, such as automobile bumpers and grills, has been the amount of hand polishing required after forming but before plating. Prepolishing can reduce this cost.

One parts plant devised a method to coat flat steel before deep drawing. Results were so good that the method was tried on parts to be chromium plated.

Blanks are now polished in the flat condition, coated, formed, and transferred directly to copper plating without any part polishing. Prepolishing is done by a conveyorized machine in which stock passes through rolls to iron down burred edges left by blanking and then to a six-station belt polishing unit.

The latter unit has 120- to 240-grit aluminum-oxide belts driven by 50-hp. motors at 5,000 fpm. Work surface produced has a smoothness of 12 to 14 rms. microinches. About 0.005 in. is removed.

Emerging from the machine, the stock passes first through a strip washer, then coating rolls that apply the semiplastic coating. As the coating is water soluble, it can be washed off after parts are formed.—Steel, Apr 17, p76

Clay for Building Block

Marietta Construction Corp. has started production of building block made from a lightweight aggregate of ordinary yellow clay and finely ground coal. Mixture is called "Aglite." Mixture is sintered in ovens at 2,200° F. and comes out of the oven in solid clinkers. These are pulverized and made into the blocks.

The company believes block can be produced at half the former cost of sand-cement block. Sample blocks have passed American Society of Testing Materials and are almost as strong as those made from regular heavy cement.—Business Wk, Apr 29, p72

Tow Converter Successful; Gives Predetermined Length

Designed to convert or change tow into sliver of predetermined length regardless of kind or type of fiber, Warner & Swasey Machine Co.'s Pacific converter is the result of over 10 yr. research. Blending attachment permits controlled blends with wool taps or other fibers—animal, vegetable, or synthetic.

Use of the converter eliminates mixing, picking, carding, gilling, and combing. Unit costs only a fraction of the cost of standard equipment normally used.

Production depends on speed of motor sheave. A 3.6-in. pitch dia. sheave giving a rotation of 422 rpm. to main shaft is standard with unit. Under ideal conditions, a 4.0-in. sheave will give 470 rpm. Maximum amount of tow that can be fed is 2,000,000 denier of all synthetics except nylon. For nylon, maximum capacity is 1,500,000 den.

Recommended capacity fed to blending rolls is 2,000 gr. per yd. Maximum sliver that passes crimping box is 340-400 gr. per yd. Converter will produce about 118 lb. per hr. of 3-den. viscose, operating at 80% efficiency.—Textile World, May p75

Tube Has 400-Digit Memory

New memory tube, developed at Massachusetts Institute of Technology, looks like a glass automobile muffler with an extra pipe coming out of one end. It can store 400 digits by recording a choice of two digits in any of 400 different positions.

The tube will be particularly useful for computing machines that solve all their problems in terms of so-called binary digits. It can receive a number in 0.00002 sec. and give one out just as fast.

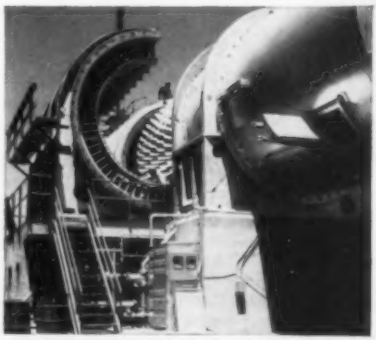
The memory takes place on electrical islands made by beryllium metal deposited on a sheet of insulation in a minute checkerboard pattern. An electron beam acts as a writing beam and selects a small area of the storage surface to apply either of two voltages—one meaning yes and the other no.

Later, the beam can be redirected at the area to read off the signal it applied earlier. Information can be held as long as power is on.—Electronics, May, p130

Ventilates Charging Station

Low-cost battery-charging station to serve each loader-shuttle-car mining unit can be made possible by the use of portable galvanized-steel overcasts. Overcast conduit is made in 3-ft. long joints of 6x36-in. cross-section, bolted together or nested like stove-pipe.

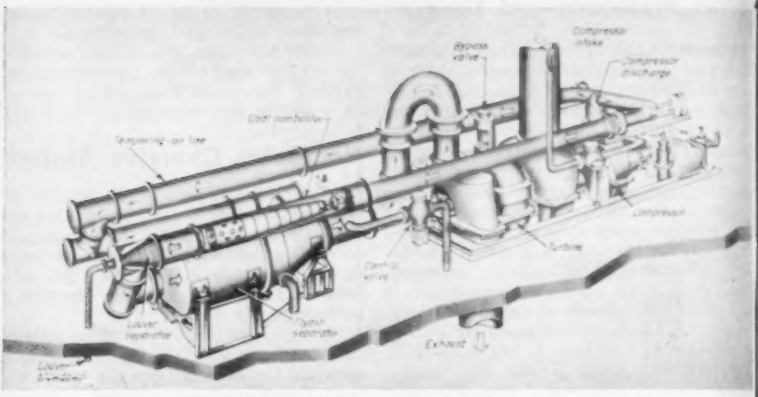
Charging station is set up in forward room neck and a stopping is erected to separate the station from the intake airway. Gases produced in charging are carried through the stopping, across intake airway, and through stopping in crosscut directly to return airway.—Coal Age, May, p101



BIG WIND NEEDS BIG PUSH

New Ames Aeronautical Lab wind tunnel for supersonic flight tests has 8-stage axial compressor pushing air past test models at flows up to 1,700,000 cfm. and speeds of 840-1,500 mph. Compressor, which has 416 rotor blades, is driven by tandem 25,000-hp. motors.—Power, Apr, p107

This Experimental Coal-Fired Gas Turbine . . .



Full-scale test of coal-fired gas turbine, developed by cooperative program of nine railroad and five coal companies, is now underway. Compressor of Houdry-process gas-turbine plant discharges into two lines. One contains coal-combustion system and flyash separators, the other an oil-burning system. Unit starts on oil, transfers to coal. Coal combustor consists of telescoping cylindrical steel sections. Air enters at slots between rings. Burning rates have reached 1,800 lb. per hr. Louver separator forms first stage

Multiple Cushions Give Press Shop Flexibility

Chrysler Corp. has increased its metal-stamping capacity by 25% with a new 415,000-sq. ft. press plant. Although the plant is engaged primarily in mass production of automobile stampings, every precaution was taken to insure flexible operation.

One such precaution is a development that avoids downtime on single-action presses. Instead of using say two large die cushions, twelve or more cushions standardized to 16-in. piston dia. by 12-in. stroke are mounted in the press bed.

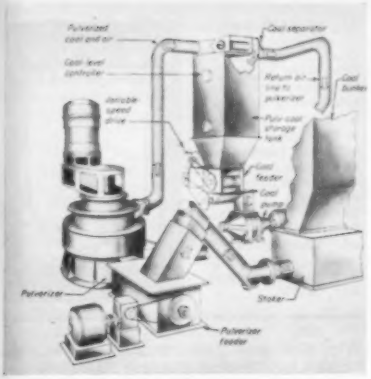
If any cushion fails, the extra capacity built into each cushion enables two cushions to take the load ordinarily spread over three. These small cushions are readily removed and serviced.

Use of multiple die cushions makes die synchronization unnecessary when two dies are mounted in a press. With only one cushion and one pressure plate, dies would have to be synchronized or the pressure plate would tilt. With multiple cushions, two dies can run side by side, even if one is on long pins and the other on short.—Am Mach, Apr 3, p133

Crewless Lightship

Crew of the lightship EXP-99, to guide ships into New York harbor, will be entirely electronic equipment—no men. Built by Westinghouse Electric Corp. for the U. S. Coast Guard, the 91-ft. ship will be remote-controlled from shore stations. Single shore-based operator will control the ship's lights, radio, and radio signals. Signals returned by ship's electronic devices will tell shore station how equipment is operating.—Business Wk, May 13, p44

. . . Is Proving Satisfactory in Full-Scale Tests



of ash removal. Final removal is by separators. At firing rate of 1,800 lb. per hr., combustor heat release is about 750,000 Btu. per hr. per cu. ft. Combustor runs cool and clean. Coal-preparation system has bunker from which a stoker screw moves coal to feeder

and pulverizer. Powdered coal goes through separator and into storage tank. Rotary coal pump feeds coal to combustor. As the test installation is not intended to produce power, there is no generator in the hookup.—Power, May, p80

Mechanized Pallet Loading Saves Driver 30% in Time

Specially designed truck bodies of Kraft Foods Co. utilize chain conveyors within the truck to speed loading and unloading. Drivers save 30% in time—never have to enter the truck to pick up load. Loading device is pushbutton-controlled, moving both forward and backward.

Kraft-designed pallets are loaded according to sales tickets and delivery route; last load off is first load on. Conveyor is driven by an electric motor operating off the truck battery. Drain is about equal to that of a heater.

Loaded pallets are brought to the loading platform by fork lift truck and are placed on the chain. Tongues engage the pallet and move it in far enough for a second pallet to be placed.

At unloading point, driver pushes the button controlling rearward movement of the chain and proceeds to unload orders in reverse order in which they were loaded. Future Kraft trucks will be fitted with front side doors to facilitate storage of empty pallets on the empty end of the conveyor.—Mod Plastics, May, p40

Liquid Wax Saves Wax, Labor

A dairy in eastern U. S. has switched from cake to liquid wax in its paper-carton forming and coating machines. Result: 22% saving on wax, 60% on labor.

Some special provisions had to be made to handle the liquid wax. It is delivered at 160° F. by tank truck, stored in temperature-controlled tanks, and pumped to steam-heated reservoirs of carton machines. The system has required interlocks, pumps, valves.—Food Ind, May, p87

Technical Shorts

Cut Electrical Costs—Operating and maintenance costs in electroplating room can be cut by (1) keeping distribution runs to a minimum with generator room ring bus, (2) removing fumes to reduce rheostat and lead-cable maintenance, and (3) locating electrical equipment in generator room and keeping it at positive air pressure to keep out fumes and dust.—Elec C&M, May, p86

Deep-freeze Tractor Runs—An International Harvester T-20 tractor left for 7 years in the Antarctic operated efficiently after it was chopped out of its ice coating. Carburetor was replaced and the tractor sputtered, then roared off.—Cons Meth & Equip, May, p93

Australian Strip Mill—Erection of hot-cold strip mill and tinplate plant at Port Kembla, New South Wales, will be Australia's largest single industrial construction project. Plant will have 25 acres under roof. Electric-motor power will total 133,000 hp. —Mach, Apr 29, p664

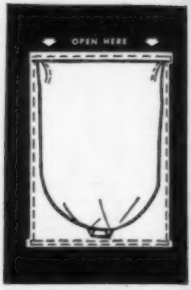
'Copters Spray 15-million Lb.—Bell Aircraft Corp. helicopters applied more than 15-million lb. of chemicals on crops during 1949. Gain was from 6 craft in dusting service in 1949 to 83 in 1949. Rotor downwash forces chemicals through heavy foliage. Maneuverability permits helicopter to operate over small fields.—Aviation Wk, Apr 3, p39

Eases Coal Drilling — Abundant drilling power is easily and speedily applied to an electric coal drill by a mine roof jack. Timber bracket is removed and an adapter attached to hold drill vertically. System is used to drill holes for roof bolts.—Coal Age, May, p98

Talking Traffic Lights—Syracuse, N. Y., traffic signals now talk. In cooperation with General Electric Co., the city has installed automatic tape recorder loudspeakers on traffic signals. Each time light changes, safety slogan changes. Sample: "Look right—look left. It may save your life."—Fleet Owner, May, p91

CANNED BAG

Chemicals for X-ray film were packaged in glass. Now General Electric X-ray Corp. packages the chemicals in polyethyline bags sealed in can as shown. Bag is crimped to top seal of can. When can is punctured, bag is broken. Weight saving is 40%, space 33%. — Mod Packaging, Apr, p151



Why Graphite Lubricates—That was answered by General Electric Research Lab. finding that water in vapor form, acting as lubricating film, was responsible for the seemingly self-lubricating behavior. The discovery may help prolong life of graphite brushes in aircraft motors and generators because they operate where the air may be dry.—Steel, Apr 24, p73

How to Reduce Absenteeism—Hickey-Freeman Co. at its Rochester clothing plant cut absenteeism 25% by installing germicidal lamps. Most obvious effect was reduction in objectionable odors caused by steaming wool in the pressing operation.—Elec World, Apr 24, p142

Electropolishing Makes Wire — Electropolishing is being tried as a substitute for drawing wire having diameters as small as 0.00015 in. Wire becomes electrode in electrolytic bath that polishes away the surface to size desired.—Prod Eng, May, p5

Company Library — Western Electric Co. maintains a lending library as part of its employee relations program. Library is a branch of Chicago Public Library. Company also provides books. Collection includes best sellers, fiction and non-fiction, technical and reference books, hobby books, even children's books. Non-Library books can be purchased by employees.—Factory, May, p98

Control Cotton Waste—Proper waste control is the secret to economical processing of cotton. In setting up a control program, a standard waste factor must be established for each department and type of raw material used. Total amount of cotton opened in a given period multiplied by waste factor gives approximate amount of waste of each type handled in waste house. —Textile World, May, p72

Short Delays in Stripping—Good results from milli-second delay electric exploders were had in stripping to size two stations at the New Jersey Zinc Co. Five-compartment shaft was inclined 52°; dimensions were 30x8 ft. Clean break, satisfactory fragmentation, and minimum concussion resulted.—Engrg & Min J, May, p85

Fuel-briquet Binder—University of Wyoming is studying commercial uses of spent sulphite liquor from papermaking and of torula yeast-plant effluent. One possible application is as binder for coal dust to make briquets. Others: iron-ore briquetting and road-surface binding.—Paper Ind, Apr, p48

Bus Ticket Printer—Southern Greyhound Lines uses an Addressograph plate to imprint place of departure and destination on tickets used on heavily traveled routes. Hand writing time is saved.—Bus Trans, May, p66

Smaller, More Powerful Diesel—Fairbanks, Morse & Co. claims its new two-unit diesel is the fastest, most powerful unit ever built. The 4,800-hp. engine is 20 tons lighter and 29 ft. shorter than its 4,500-hp. predecessor. It has a top speed of 110 mph., pulls 28 passenger cars.—Business Wk, May 6, p20

About Aureomycin—Discovery of aureomycin's growth-producing qualities gives promise of lower-cost meats. Hog and poultry growth rate has been increased by as much as 50% by 5 lb. of aureomycin added to 1 ton of feed.—Food Ind, May, p9

Better Sulphur Removal—Soda-ash treatment of basic iron to remove sulphur is improved by using a stabilized dolomite-lined ladle. The dolomite can be pressed into bricks for large ladles.—Iron Age, May 4, p11

Controls Stage Lights—Interesting adaptation of Square D Co.'s Saflex low-voltage lighting control system has been made at University of Oregon. Ceiling and stage effect lights in banquet hall are controlled by the low-voltage unit, instead of usual, more expensive full-voltage control.—Elec West, Apr, p72

Calcium Modular Iron—Calcium, like cerium and magnesium, will produce modular cast iron. One way of introducing it is by blowing a large excess of calcium silicide through molten hypereutectic iron with a stream of nitrogen.—Foundry, May, p174

Fast Picture Taking—Aerial photography at speeds over 500 mph. is now improved with automatic light control and automatic shutter-speed control. A new photoelectric servo control unit for the aperture provides optimum exposure. It is applicable to motion-picture and television cameras. —Electronics, May, p74

Lamps Keep Concrete from Freezing—On a U. S. dam project five 250-w. infrared lamps keep concrete from freezing. Wood troughs, fitted with lamp sockets, are deep enough to protect lamps and are 20 ft. long. Trough is set horizontally at outer edge of working platform. Lamps are left on until there is no danger of freezing.—Eng News-Rec, Apr 20, p45

GAS HEAT THAWS COAL

New coal-car dumping unit at Toledo Edison Co. has an eight-car thawing track. Vertical sheet-metal windbreaks are on each side. Heat is supplied by four perforated gas pipes along the track. Cars not too badly frozen can be thawed in 20 min.—Elec World, Mar 27, p104

"PR" Plates Brighter Finishes

High luster, uniform density plates, lower buffing and polishing costs are the advantages of PR plating with new addition agent

BRIGHT ELECTROPLATING gives a brilliant, pleasing appearance to metal products. But it can create a production problem in the amount of buffing and polishing needed, especially when the process is operated rapidly.

At Westinghouse Electric Corp., this problem and others associated with bright plating are being solved by periodic-reverse-current (PR) electroplating plus a new inorganic, cyanide-copper-plating addition agent, Wes-X.

Addition agents in electroplating act something like vitamins in your body. In small amounts, they have startling effects. Their concentration is generally 0.01-0.5 oz. per gal. of plating solution.

These compounds usually are of organic character, such as saccharin and nickel naphthalene trisulphonate. They are susceptible to decomposition by electrolytic reduction or oxidation; the resulting products frequently are detrimental to the bath and must be removed by activated carbon. The carbon also removes some of the original agent.

The new metallic agent is not susceptible to decomposition and is not affected by activated carbon. Solutions therefore can be continually treated with activated carbon to remove extraneous organic material.

PR plating consists essentially of periodically reversing the d-c. plating current for a definite time interval. Repeating this makes the plate smoother and deposits metal of a higher quality.

As crystal growth is interrupted by current reversals, final structure is of fine grain. Also, reversing the current plates off some metal, particularly from outer edges and protruding areas, and thereby reduces buildup on these portions. The deposit, as a result, is more uniform.

A feature of the process for copper plating is that any cyanide solution presently operated with organic addition agents can be converted without major shutdown of the line. Procedure is merely to treat the bath with activated carbon and correct it by addition of Wes-X.

Acid copper-plating solutions also can be converted to Wes-X from organic agents.

Physical properties of PR cyanide copper-plated deposits are high. Tensile strengths vary from 100,000 to 110,000 psi. with a 9% elongation, compared with 30,000 to 40,000 psi. for regularly deposited coatings. Such properties have

NEW AUTOMOBILE HUB CAPS

New fastening device for automobile hub caps, developed by Lothar Stanetski, Bonn, Germany, does away with conventional bolts. Prongs on brake drum are gripped by five tweezer-like levers as cap is screwed on. Grip tightens as hub cap fastens.—Business Wk, Mar 25, p80

aroused interest in printing, phonograph-recording, and wire industries.

A present application for PR plating plus Wes-X is for decorative plating on high-grade steel. Technique is to polish in the flat if production quantity is high, form parts, deburr, PR copper plate, and bright nickel and chromium plate. This produces a finished part without intermediate buffing or polishing.

One such job is a door for an automatic washing machine. PR cycle is 20 sec. plating and 15 sec. deplating.—Steel, May 1, p86

Centrifugal Casting Process Produces Iron Soil Pipe

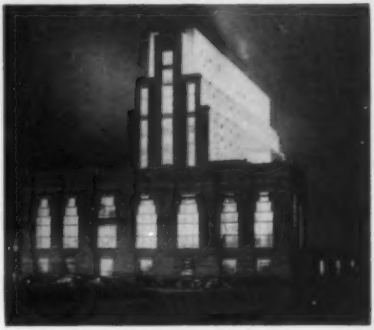
Centrifugal casting, long employed for making cast-iron pressure pipe, is finding wider adoption for soil-pipe production. Combustion Engrg. Superheater, Inc., has combined this type of casting with self-contained sand handling.

The machine used, a Herman Rol-O-Cast, makes pipe in sand-lined flasks. An electronic control system is the nerve center of the complete installation; it automatically directs some 25 timed sequences in each operation cycle.

The unit requires 2 min. for each cycle, producing four 5-ft. lengths of 40-lb., 4-in. I.D. pipe. Cycle of operation is: fill cylindrical flask with sand, spin at 1,000 rpm., insert mandrel and spin at 600 rpm. to smooth sand now lining the flask, withdraw mandrel, and pour iron with flask speed at 850 rpm.

Amount of metal poured governs wall thickness and inside diameter of pipe. So metal weight is measured to within a 5% tolerance. Cast pipe is ejected by air-operated plungers. No annealing is necessary.

Molding sand is carefully controlled to: green compression strength 16 lb., permeability 96, flowability 70, grain size 57, moisture slightly less than 5%.—Foundry, May, p128



HANDSOME POWER PLANT

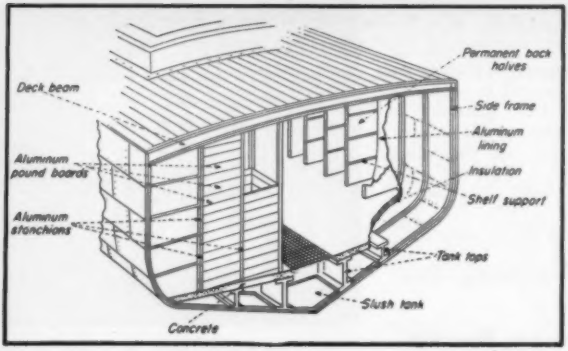
Unsightly smokestacks—long the trademark of power plants—are hidden behind the parapet of this East Lansing, Michigan, power station. Special stub stacks of Venturi design are possible because of induced draft fans at the base. Plant has three generators.—Eng News-Rec, Apr 6, p14

Build Damage-Free Box Car

A 50-ton all-steel box car, built by General American Transportation Corp. and Evans Co., is designed to give maximum shipping service, capacity loading, high monthly mileage, low maintenance, and reduced damage claims. These benefits will offset the 50% increase in first costs. No attempt was made to reduce the car's over-all weight.

To make capacity loads possible, eliminate dunnage, and reduce labor costs, the cars are equipped with D-F (damage-free) loading device. Device makes it possible to increase load about one-third. It also makes possible safe handling of partial and full loads of odd shapes.

Loader consists of angles, punched for cross members, applied horizontally from door posts to corner posts. They are welded to all posts with removable sections of angle to apply in door openings. Cross members have locking devices at ends. There are eight rails per car.—Railway Age, May 13, p48



ALUMINUM HOLDS

New type fishing trawler is compartmented and completely lined with aluminum alloy (3/16-in. Alcan 57-S sheets). Pound boards, shelves, and stanchions are 51-ST extrusions. Advantages include corrosion resistance, light weight, fast cooling properties, and also greater carrying capacity and higher speeds for the ships.—Food Ind, May, p121

Recovery of Waste Heat Is Source of Plant Economy

Waste-heat recovery has almost limitless possibilities. A wide variety of waste-heat boilers and water heaters have been designed to increase operating economy in chemical plants, oil refineries, paper mills, cement mills, power plants, and other types of manufacturing plants.

But any company, before plunging into waste-heat recovery, should determine its economy by studying these factors:

1. Quantity of heat available at temperature level above that of the heat-recovery absorption medium.
2. Permanence of heat source.
3. Value of recovered heat in usable form.
4. Permanence of value of recovered heat.
5. Value of control to primary operation offered by heat-recovery system.
6. Cost of heat recovery.
7. Cost of alternate means of disposing of excess heat, controlling primary operation, and producing equivalent heat.

Simplest form of waste-heat boiler is the fire-tube type. Water-tube boilers also may be applied to this service. Another type of equipment getting attention for heat recovery is the heat pump. In Switzerland, for example, a number of heat-pump installations for heating water already have been made.—Chem Eng, May, p140 and 146

Turbojet Flying Boat Planned

Saunders-Roe, Ltd., has computed design studies on a turbojet flying boat and is discussing the projected craft with Tasman Empire Airways officials. The proposed 74-seat craft would be propelled by six de Havilland Ghost engines of 5,000-lb. thrust.

Gross weight is 130,000 lb., wing span 135½ ft., length 124½ ft. Passenger cabin is pressurized.

Based on standard cost assessing methods, cost per passenger-mile would be just over 0.01 cents for stage lengths of 1,300-1,500 mi. Plane would cruise at 500 mph. on stage lengths of 1,500 mi.—Aviation Wk, May 15, p55

New Shipping Package

Shipping of corrosive liquids, long a tough problem in the chemical industry, is now easier and cheaper with a new package.

It is a metal container—can, pail, or drum—lined with a polyethylene film in the form of a bag. The film is made by

HOW TO RECLAIM MALARIAL ISLAND

Cuba's Isle of Pines may lose its malaria and soon be a pleasant place to live and work. The first step in the reclamation job: To get rid of mosquitoes. So the island was sprayed by plane and jeep (here in the streets of Nueva Gerona) with 300,000 lb. of a new high-concentrate DDT developed by Michigan Chemical Co. Next goal: Economic development.—Business Wk, May 6, p128

Visking Corp., and the bags fabricated by Traver Corp.

First user was General Electric X-ray Corp., which shipped X-ray developer and fixer. Results: 40% saving in weight, 33% in space, up to 66% in shipping costs—Chem Eng, May, p244

Ingot-Mold Coatings

A tricky problem facing the steel industry is to find a satisfactory ingot-mold coating. Mold coatings are essential to prevent formation of scabs on ingot surfaces from splashing or surging of molten metal.

Tar has long been used and is cheap and efficient, but it causes objectionable fumes and smoke. Steelmakers have tried molasses, salt water, sugar, starch, aluminum, and other materials.

Two new coatings are Darmold and Hydropaste. No fumes are given off by either one. Darmold is a colloidal graphite solution, while Hydropaste consists of fine aluminum plus a binder.

So far the two coatings have not proved as good as tar in performance and cost. In semikilled grades under 0.30% C, however, Darmold has proved better than tar at the Carnegie-Illinois Gary works as far as ingot surface is concerned.—Iron Age, Apr 27, p84

Recover Placer Scheelite

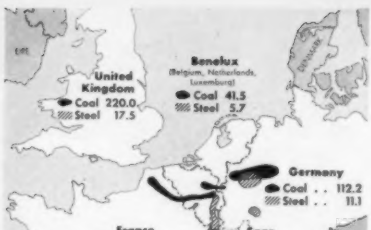
Scheelite is being recovered from 1860 tailings and from virgin placer ground by H & H Mines, Inc., by combining dredging with milling, both aboard the dredge and ashore. Creek deposit is about 15 ft. deep, with an average channel width of 400 ft. Tungsten occurs as particles of scheelite, particles ranging in size from 10 mesh to microscopic fineness. Gold present is moderately fine and averages 920 fine.

Tests proved that low-grade scheelite could be made aboard the dredge without heavy tailing loss. To raise grade to 60%, tailing and milling are done at a shore plant. scheelite being transported by truck.—Engrg & Min J, May, p82

Warns of Engine Failure

Principle of magnetic sump plug as engine failure indicator is being used by Svenska Aeroplan AB. Sweden. Device can detect an incipient engine breakdown as soon a disintegration begins.

Unit consists of a sump plug mounting a silver center electrode with six holes around its edge. Six separate electrodes partially obstruct holes. Oil may pass freely, but metal particles are caught.—Aviation Wk, May 15, p45



POOL FRANCO-GERMAN RESOURCES

French Foreign Minister Schuman's proposal to pool Franco-German coal and steel resources brings economic and political integration closer in Europe. The proposal should go into effect this year or next. Plan will heal the long Franco-German feud; create sufficient resources to develop Africa with American dollar help; supply steel capacity to meet Europe's needs. Italy too will be in combine.—Business Wk, May 20, p133

Reduces RR Tie Handling

Two new railroad tie-tying methods devised by Brainard Steel Co. add on 4 cents costs per tie and save 30% in unloading and distribution costs. After treating, ties are banded into bundles with heavy-duty strapping. Bands both contain ties during shipment and serve as slings during unloading.

In one method of banding, straps are applied to tram load with only enough slack to permit load to flatten out in car. Load is handled by a single spreader-lift on crane hook. In the other method of bundling, more slack is left in straps to permit single ties to be removed from the load. Double lift is used in unloading.—Railway Engrg & Maint, Apr. p366

Coordinated Tool Control Cuts Carbide-Tool Costs

Coordinated plant-wide control of cutting tools has saved money for Worthington Pump and Machinery Corp. Program elements—methods, standards, design, procurement, reconditioning, inventory control, application, and trouble-shooting—have been integrated under the tool and equipment engineer.

Standardization, especially in single-point carbide tools, is stressed. Seventeen catalog-listed carbide blanks are adequate for tipping 90% of all single-point tools. A perpetual inventory record provides close accurate control on all standard carbide blanks. Also, all tools are cataloged.

In fabrication of carbide tools, these measures have cut costs:

1. Use of predetermined time standards and routing cards, which originate in the methods and standards office.
2. Straight-line production methods.
3. Grinding only the lower side of the shank to provide a locating surface.
4. Slab milling of seat for carbide tip and brazing the tip on one side only and slightly at the back end.
5. Casting as many tool shanks as possible, using plant's foundry and pattern shop.—Iron Age, Mar 30, p86

Topographic-Study Costs Cut

Aerial photography provided Philadelphia Electric Co. with quick, inexpensive means of obtaining information about actual flow effects and shore lines of a river below a hydro station.

The method cost one-tenth as much as a topographical survey by instrument parties. Results were available in 2 days.

Three overlapping photographs were taken at each of three different tailwater elevations. Prints afforded an accurate means of examining river and shore contour outline at three flow values.—Elec World, Apri 24, p111

Powder Parts Copper-Coated To Improve Chrome Plating

A difficult operation on powder-metal parts is successful electroplating. Porosity is the main source of trouble.

But the Illinois Lock Co., to plate its standard brass locks, has developed a procedure that avoids the trouble caused by porosity. The cycle begins with a thorough solvent cleaning to remove oil from the pores. This is followed by light polishing and buffing, alkaline cleaning, rinse, acid dip, and another rinse.

Parts are then copper-coated for 25 min. to a minimum thickness of 0.0003 in. to obtain sufficient conductivity for successful nickel and chromium plating. Otherwise, conductivity is so low that uniform distribution and adhesion of coatings are difficult to obtain.

Subsequent operations are normal. Parts are rinsed, dried, buffed, alkaline cleaned, rinsed, acid-dipped, and rinsed. Next step is 12-min. dip in a bright nickel bath to build up a 0.0005-in. coating.

After rinsing, parts go to a chromium bath for 4 min. for a 0.0001-in. coating. —Iron Age, Apr 20, p87

Better Pot-Spinning System

Improved pot-spinning and twisting frames, developed at Abbot Worsted Co., produce large packages. Controlled centrifugal force is the principle used in the new machine. Eliminated are rings, travelers, caps, tapes, and cylinders.

Model 8 pot-spinning frame can spin 19s worsted yarn at 11,000 rpm. Front rolls run at 120 rpm. In a 2-hr. test, there were no ends down. Piecing up broken ends takes little skill. End from front roll is inserted in top of stationary guide tube. Partial vacuum created by the revolving pot carries end into pot. Package is not removed.

Samples spun range from 4s to 70s worsted count of different grades of wool, wool blends, nylon, and rayon.

Pot-twisting uses the same principle of insertion and winding. Twister package is larger, is produced faster with less doffing and creeling. Packages up to 3½ lb. are made.—Textile World, Apr, p124

Oil-Powder Tests For Cracks

Surface cracks and other discontinuities in metals and other dense materials can be detected by an oil-powder method developed by U. S. Navy Engineering Experiment Station.

First, colored penetrating oil is applied to the surface and then wiped off. A dull white powder is dusted on. In a short time, any cracks or flaws are revealed as sharp red lines on a white background.—Foundry, Apr, p130

GIRLS, MIRRORS, AND LIGHTS . . .

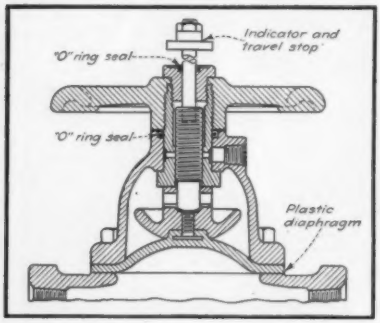
. . . combine for inspection of soldered connections on undersides of television chasses. Up-ended sets ride a moving conveyor at Allen B. Du Mont Labs, Inc., and each girl inspects a specific portion. The mirror is the kind used by dentists.—Electronics, May, p186

New Products

Miller Has Dual Controls—Model 3MI milling machine, made in both plain and universal styles, has all operating controls duplicated at rear working position on left-hand side of column. Specifications: 7½-hp. motor, 14x62½-in. working surface, 16 spindle speeds from 25-1,500 rpm., 16 feeds from ¼-3 ipm.—**Cincinnati Milling and Grinding Machines, Inc.**—Am Mach, Apr 17, p132

Tensionless Scouring—Fabric in open-width or rope form is scoured without tension in unit. Cloth is conveyed through unit by multiple reels, assembled on a single shaft. Each reel acts as an individual variable-speed drive, automatically adjusting tension or slack.—**James Hunter Machine Co.**—Textile World, May, p111

Plastic-lined Paper Plates—A heat-resistant, thermosetting plastic lining has been developed for paper plates. Non-brittle coating is impervious to water, is unmarred by cutting.—**Bowes Industries, Inc.**—Mod Plastics, May, p76



GREATER ACID RESISTANCE

Flexible plastic diaphragm in Hills-McCanna Co.'s model 6600 valve increases its acid resistance. Diaphragm is polyethylene. Special seals prevent acid from spraying out the bonnet in case of damage to diaphragm. Travel stop on stem avoids crushing of diaphragm by excessive torque.—Prod Eng, May, p96

Core-sand Binder—Resinox 4846, a thermosetting rapid-curing phenolic resin, provides cores of high tensile strengths, high baked permeability, good abrasion resistance, rapid baking, excellent dimensional stability, good collapsibility. Gas products burn without bad odor or smoke.—**Monsanto Chemical Co.**—Foundry, Apr, p216

Barks Logs—Streamlined Streambarker handles logs up to 24 in. in dia. Machine entrance is through two doors in sloping portion of sides, allowing less chance for water passage to outside. Oil-controlled cylinder permits accurate control of crooked logs.—**Allis-Chalmers Mfg. Co.**—Paper Ind, Apr, p96

Midget Trencher—Trenches 4¼ in. wide and up to 30 in. deep can be dug with a midget hand-fed, ratchet-type digger. Multiple cuts can be made for larger dia. pipes. Scraper follows digger to give clean bottom. Soil can be deposited right or left.—**Charlie's Machine Works**—Eng News-Rec, May 11, p122

Diesel Generating Plants—Five new models of diesel-driven electric generating plants are equipped with automatic voltage regulators and range from 12½-55 kw. Engine is cranked with 12-v. starting system. Recharging generator keeps starting batteries at full charge.—**D. W. Onan & Sons, Inc.**—Elec C&M, Apr, p105

Adjustable Polaroid Glasses—By moving tabs on the underside of glasses frames, the wearer can adjust the amount of sunlight passing through polaroid lenses.—**Pioneer Scientific Corp.**—Bus Trans, May, p148

Spray Fan Coolers—Designed for refrigerated rooms with restricted ceiling height, new series of spray fan coolers have fan section on side of unit. Air enters spray section at top and is cooled passing down through spray and over coils. Five sizes are available.—**Niagara Blower Co.**—Food Ind, Apr, p94

Automatic Controls—A thermostat for temperature control has its own heating element. Element creates heat equivalent of radiator, the thermostat measuring this heat instead of room air. It cuts down long burning periods, gives closer control . . . Humidity is controlled to within 0.5% of desired setting by a plastic rectangle inlaid with gold. When attached to amplifier, it can measure tiny moisture additions to the atmosphere.—**Minneapolis-Honeywell Regulator Co.**—Business Wk, May 6, p64

Protects Pipe-line Joints — Welded pipe joints, above or below ground, are protected from rust and electrolytic corrosion by a self-adhesive tape — Scotch-Brand #22. Tough, flexible, and nonflammable, the tape is applied from roll. It is resistant to acids, alkalis, oils, moisture, and fungus.—**Minnesota Mining & Mfg. Co.**—Factory, May, p130

Single-stage Turbine — Mechanical-drive turbine handles pressures to 1,450 psi., initial temperatures to 950° F., and backpressures to 300 psi. Unit is made in three sizes for capacities up to 200 hp.—**De Laval Steam Turbine Co.**—Power, May, p150

Continuous Acetylene Flow—New stationary-type generators supply continuous flow of acetylene in capacities of 500-2,400 cu. ft. per hr. The unit, called the A-Twin, requires little attention: just refilling hopper with calcium carbide and metering needed amount of water to tank.—**Sight Feed Generator Co.**—Weld Eng, May, p44

Heavy-duty Coupling — Cushion coupling is designed primarily for engine drives and applications involving severe torque fluctuations. Hysteresis in rubber gland damps vibration. No lubrication is needed. Coupling also acts as electrical insulator between driving and driven machinery.—**Falk Corp.**—Prod Eng, May, p166

Indicating Micrometer—Bench micrometer No. 245 can measure in three ways: (1) from 0-½ in. directly from thimble, (2) as a comparator with readings to 0.0001 in. taken from dial gage, and (3) directly from dial gage to 0.0001 in. with micrometer set at nearest 0.001 in. of measurement.—**Brown & Sharpe Mfg. Co.**—Iron Age, May 4, p40

MAGNETS REPLACE LATCHES

Permanent 1-in. Alnico magnets hold doors closed on General Electric Co.'s new refrigerators. As door moves to within few inches of cabinet, magnets pull it tight quickly and silently. Magnets line door gasket area. Only moderate hand pressure is needed to open the door.—Iron Age, Apr 20, p97

New RR Snubber—Flowing and shockproof ride is assured by a new snubber, tested on a standard box car over a 50,000-mi. test. Large friction shoes provide low unit bearing pressure. Snubber is 8¼ in. high, travels 1⅝ in.—**W. H. Miner, Inc.**—Railway Mech & Elec Eng, May, p109

Air Conditioners—Six new models of hermetically sealed room air conditioners feature compact design, quick cooling, air filtration, moisture removal. Two models can be equipped with ducts for conditioning multiple areas.—**York Corp.**—Am Builder, Apr, p60

Glass Conducts Electricity—New conducting glass has transparent skin that offers sufficient electrical resistance to heat glass up to 660° F. Skin is metallic oxide about 0.000016 in. thick. Operation is on 115 or 230 v. ac.—**Corning Glass Works**—Elec World, May 8, p140

New Products (Cont.)

Selective Speed Drives — Integrally mounted electric motor and four-speed transmission are combined in type F3C heavy-duty selective speed gearshift drives. Primary gear ratios are 4.15, 3.15, 1.85 and 1 to 1. Secondary ratios are from 1.00 to 2.25. Units operate on polyphase a. c. of standard frequencies and voltages below 600 v.—**Lima Electric Motor Co.**—Steel, May 1, p129

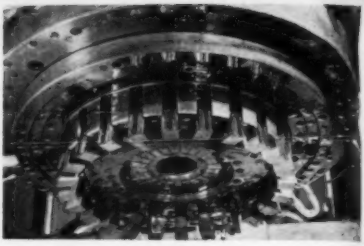
Loom Switch—Pushbutton-operated switch for textile industry has lint-proof enclosure, positive make-and-break mechanism, and eutectic element overload mechanism. Switch is rated for polyphase motors up to 2 hp. and 220-660 v.—**Cutler-Hammer, Inc.**—Elec C&M, May, p121

125 Shots per Hr.—Model 400-M die-casting machine has maximum production of 125 shots per hr. and die-clamping pressure of 400 tons. Designed for cold-chamber injection, machine has high sustained injection pressure, thereby reducing casting porosity.—**Hydraulic Press Mfg. Co.**—Am Mach, May 1, p130

Navigation Aid—Time is automatically converted to distance by a new lightplane navigation instrument. Pilot sets estimated ground speed into device and starts the built-in timer. Miles flown are read from instrument face. It adjusts for speeds of 65-240 mph.—**Grimes Mfg. Co.**—Aviation Wk, May 15, p46

Expansion Roof Bolt—Expander plug and shell of roof bolt expand to provide for oversized or inaccurately drilled holes in a new roof bolt. Failure of expansion assembly to expand when turned is prevented by reverse-tapered wings on plug. Available with ⅝- and ¾-in. dia. rods in any length.—**Elreco Corp.**—Coal Age, May, p104

Reverse-circulating Drill—Water in drill hole is drawn up inside drill stem by vacuum action of a gravel pump in a new reverse-circulation drill. Limitations are by depth, not diameter of hole. Tests proved 60-in. dia. holes could be drilled to depths in excess of 600 ft.—**Winter-Weiss Co.**—Cons Meth & Equip, May, p96



FORM-CUTS INTERNAL GEARS

This Michigan Tool Co's Shear-Speed machine reverses tool-feed action used for cutting external gears. Using two inverted cones, tools feed outward before each stroke of reciprocating work and its holder and retract slightly before return stroke. First machine in service cut 5,000 gears of 12-in. P. D. without a tool grind. Cycle time was 24 sec., output 90 parts per hr.—Steel, May 8, p84

One Wrench, Not 29—Repairman can carry one wrench to do the work of 29 he now carries. Moveable jaws on wrench are punched, a bolt through hole fastens them to frame. To adjust wrench to fit nut, bolt is slipped through hole that gives best fit.—**Owatoona Tool Co.**—Business Wk, May 13, p49

Heats Dielectric Materials—The 1.5 AH preform heater is a bench machine to heat plastics, rubber, other dielectric materials. It will raise temperature of 11/3 lb. of material 170° F. in 1 min. Capacity is 8x6x3 in.—**High Frequency Heating Co.**—Electronics, May, p236

Records Monoxide—CO recorder provides continuous measurement of low CO concentrations in air. Pump forces air sample through dryer and analyzer where CO is oxidized and percentage registered.—**Mine Safety Appliances Co.**—Oper Eng, May, p76

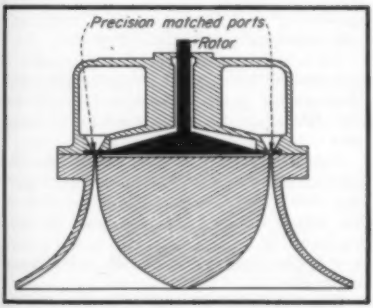
Glass Bearings—Developed for use while submerged in corrosive solutions is new line of metal-backed glass bearings. Bearing surface is cast-iron or low-carbon-steel tube coated with fused-on hard glass. Sizes range up to 12-in. dia.—**Farley M. Caldwell**—Chem Eng, May, p174

Mixes Dry Materials—Unique mixer, called the P-K Twin Shell Blender, has two cylindrical shells of equal diameter. Shells are joined together to form a V, which rotates around a horizontal axis. Capacities are 1 to 300 cu. ft.—**Patterson-Kelly Co., Inc.**—Food Ind, May, p128

Electric Steam Boiler—Moderate amounts of steam up to 90 psi. can be produced in stationary automatic electric steam boiler. It also works as a steam cleaner. Available sizes are 40, 60, and 90 gal.—**Siebring Mfg. Co.**—Elec World, Apr 24, p144

Hand Hoists—Safeway geared hoists have capacities from ½ to 4 tons. Features include close headroom design, self lubrication, steel load chain, steel housing, and drop-forged top and bottom hooks.—**Wright Hoist Div., American Chain & Cable Co., Inc.**—Oil & Gas J, May 4, p160

Hot Feet at Work—Molded-rubber electric heating pad keeps worker's feet warm when he is standing still on a cold floor. Pad is thermostatically controlled, operates on 110-120 v., and measures 14x22x5/32 in.—**Thermo-Mat Co.**—Elec West, Apr, p40



REMOVES STACK DUSTS

High sound pressure potential is first prerequisite for sonic treating, such as for aerosols on commercial scale. This sound generator can produce required potential. Compressed gas is forced through rotor ports and then stator ports. Intermittent gas flow, as rotor turns, create sound wave, which is directed by acoustic horn. Maker is Ultrasonic Corp.—Chem Eng, May, p158

Pelletized Seed—Pelletized vegetable and flower seed is one of the most important developments in seeds in years. Seeds have built-up coats of clay-like matter similar to a pharmacist's pill. A lettuce seed becomes a sphere the size of a pea. Coating can incorporate germicides, fungicides, and nutrients. Process adds to seed cost but added cost is partially offset by simpler, more accurate sowing.—**Henry A. Deere, Inc.**—Mod Packaging, Apr, p134

Brick-faced Concrete Block—Concrete building blocks have colored cement brick facing applied as an integral part of block. They combine durability of brick with low cost of block construction. All standard colors and finishes are available.—**National Bric-Block, Inc.**—Eng News-Rec, Apr 27, p110

Conveyor Scales—Built right into the conveyor system, a new scale not only checks weight and classifies cartons but will reject off-weight cartons. Scale counts numbers, and prints weight of carton passing over conveyor up to 15 cartons per min.—**Toledo Scale Co.**—Factory, May, p140

Photoelectric Balancer—Rotating parts up to 20 lb. can be precision-balanced with model M2 dynamic balancing machine. It employs photoelectric scanning arrangement. Both phase and amount of unbalance are shown simultaneously on cathode-ray screen.—**R. B. Annis Co.**—Steel, May 8, p109

Ready-cemented Tile—Adhesive is already on the back of polystyrene wall tile, no separate mastic being needed for laying-up. Adhesive is protected by a paper backing. Installation is simple: tile is soaked for 30 sec. in 130° F. water until paper slides free; excess water is wiped off; tile is applied to surface by firm pressure.—**Meyercord Co.**—Mod Plastics, May, p70

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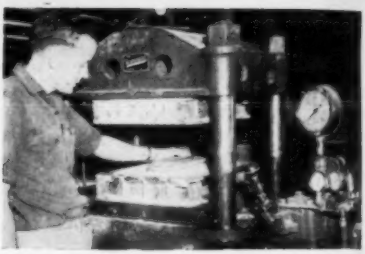
MUSTARD CUP cover die used in ram process production of ware



BATT is placed on lower die for pressing into a 10-in. rolled edge platter

Process Speeds Ware Forming

Production speeded, costs cut, ware improved by Shenango process. Process lends itself to odd-shaped pieces as well as flat ware

SHENANGO POTTERY CO. is the first manufacturer to adopt the ram process for commercial manufacture of restaurant and hotel china. Advantages over conventional jiggering and casting methods are:

- Adaptability to production of pieces of non-uniform cross-section.
- Savings up to 50% over former casting methods of production.
- Less floor space required for manufacture.
- Strength of ware increased.
- Internal strains avoided.

Essentially, the process consists of forming objects from a plastic clay body by pressing in gypsum-cement dies. Process is used on those items formerly made by casting—mustard cup covers, celery boats, bakers, and oval platters. In these items, savings frequently run 50% over casting production costs.

Ram process requires about 100 sq. ft. of floor space for the press, dryer, and other equipment. Little additional space is required for storage of molds.

The instantaneous release mechanism permits production nearly comparable to jiggering and nearly competitive with jiggering for some objects. Ram pressing of ware requires a batt similar to jiggering. Batt may be formed by the press operator while he sets the press in motion. Trimming of batt takes only a second or so. Shenango uses both one- and two-man production crews.

Following spreading, the pancake is laid on the lower die. Press is actuated. Moisture in pancake is squeezed into the die. Water in die is removed by vacuum, plus compressed air purging.

Compressed air is used to release the piece from the die. Normally, the operator lets the piece remain suspended in the upper die and then releases it onto his hand or onto a flag. On some pieces it may be preferable to lift ware from lower die.

Ware is dried on a shelf drier. Fin or seam left after forming is slightly harder to finish off than jigged pieces but is much simpler than finishing cast ware.

Additional strength is due to the strain-free condition of the pressed ware. Warpage in drying and firing is minimized by absence of internal strain. Percentage of first-quality ware is high. —Ceramic Ind, Apr, p127

Better Catsup Is Made by Close Process Control

Color, flavor, and consistency are prime factors of tomato catsup. They are influenced by processing as well as by tomato quality.

Major processing steps are washing, sorting, trimming, chopping, pre-heating to inactivate pectinase, pulping to separate liquid from coarse solids, cooking, seasoning, cooling, bottling.

To get good color in the catsup, the heated "cyclone juice" from the pulper should be held for only a short time. Prolonged heating at 175° F. results in gradual loss of color. The batch should be concentrated in 30 min. or less. Quick cooling also avoids color change.

Flavor is obtained by adding sugar, salt, vinegar, and a seasoning blend during concentration. Acidity of 1.5-1.7% prevents spoilage after the bottle is opened. Seasonings should be free of tannin because it affects color.

Consistency is influenced by inactivation of pectinase, retention of tomato solids, and mesh size of the finishing screen.

Viscosity can be decreased and catsup made thicker by adding more sugar and less tomato solids. Substituting dextrose for sucrose keeps the flavor balance. A larger mesh size also thickens the catsup, but gives it a coarser body. Most manufacturers prefer a 0.027-in. screen.—Food Ind, May, p83

Accurate Shaft Surveying

Combined Metals Reduction Co. has completed a connection survey between two drifts on the 1,200-ft. level with an error of closure of 1/9600 and an angular error of closure of 30 sec. Survey involved transferring the meridian from a triangulation system on the surface to the 1,200 to 1,400 levels; from the 1,400 level to the 1,200 level at opposite ends of the workings through a 300-ft. vertical raise. Survey was carried through 7,480 ft. of drifts.

Special equipment required was designed and built in mine shops. Steel plumb bob weighed 75 lb. and was supported by 0.037-in. steel piano wire. Standard transit was used.—Engrg & Min J, Apr, p90

Pipe Dry Bulk Materials

Flintkote Co., manufacturers of asbestos shingles, has installed a pneumatic pipeline conveyor to unload and store. The system has nearly paid for itself since installation. One man controls the entire materials-handling system.

Bulk materials arrive in hopper cars, material dropping into an underground conveyor which carries it to a pump. From pump, materials can be moved to roof storage for immediate use or to yard bins for storage.

Additional benefits: Increased plant capacity 40%; saved 3,200 sq. ft. of floor space; eliminated in-plant dust; freed several men for productive work.—Factory, May, p85

GOING TO SCHOOL

This man is a student at Consolidated Edison Co.'s fire school. It trains key employees on fire causes and how to put them out. Trainee fire fighter is using dry chemicals to extinguish a propane fire at a defective gasket in a 4-in. pipe flange under 125-psi. pressure. He will also learn about oil and electrical fires—and when to let a fire burn itself out.—Power, Mar, p107

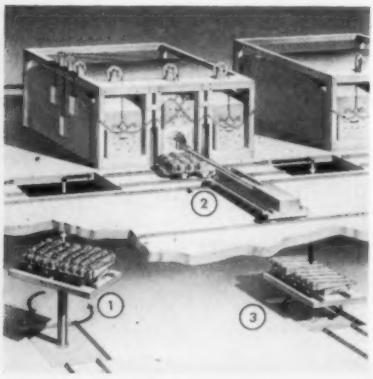
Split Air Conditioning Raises Operating Profits

Textile production at Narricot Co. went up and down with the weather in its old plant. But air conditioning the new mill with a split system corrected all that—and boosted over-all operating profits by an estimated 10%.

The new system maintains desired weather in the air-conditioned areas within 1° F. dry-bulb and 1% relative humidity. The slasher room is not air-conditioned. It is located in the central part of the mill and has screened openings through which exhaust air from the air-conditioned zone passes.

This fairly cool exhaust air holds the slasher room at a reasonably comfortable temperature. Appreciable savings were made in the equipment installation by this arrangement. If the heavy load in the slasher room had been added to the design, refrigeration machinery would have had to be much larger.

The split-system feature of the installation resulted from the "cold-wall" drain caused by a 4½-ft. glass-block strip running around the building. To compensate for this heavy outside-wall load, a hot-water radiant-heating installation is mounted in the lower sections of the wall.—Power, May, p94



EASES FURNACE JAM

Empty scrap cars no longer jam up in front of openhearth furnaces at Armco Steel Corp. with this turn-table system. Incoming buggies of scrap are raised to furnace floor on a hydraulic hoist (1). Hoist turns 90° so buggies can roll to furnace door. Three, charging machine (2) raises scrap pan, dumping load into furnace bath. Empty pans are lowered to loading floor by a second hoist (3).—Business Wk, May 13, p45

Good Hints for Management

If your steels get mixed, look at Jones & Laughlin Steel Corp.'s "Steel-sorter." It differentiates between all types of carbon steel by responding to magnetic differences—whether chemical, physical, or metallurgical.

Lockheed Aircraft Corp. literally builds its plant around the process. Erected in the open are: an 8,000-ton hydraulic press, a 200-ton stretch press, stamping press, and their auxiliary equipment. Later a 33,000-sq. ft. building will be erected around the equipment. It's part of a $2-million building program.

You can save 50% in forming sheet metal by the Marform process, Glenn L. Martin Co. says. Process gives precise control of pressure curve for forming cycle. Parts are wrinkle-free; springback is greatly reduced.

A handy packet comparator lets your inspectors check small parts for linear measurement, circles, angles, etc. with one instrument. It is made by Bell & Howell Co.

Management knows that modern production methods and equipment pay dividends. If a 1950 U. S. automobile were built with 1910 methods and equipment, it would cost about $60,000 to build. Today's car averages $2,000.—Factory, Apr, p60

SIZE COMPARISON of image-orthicon and vidicon tv. cameras shows how . . .

Photoconductive TV Tube Simplifies Pickup Unit

Photoemission of electrons has been widely applied for the light sensitive surface of television pickup tubes—image orthicon, orthicon, and iconoscope. Photoconductivity has now been employed for the same purpose.

Light sensitivity obtainable with photoconductive cells greatly exceeds that for photoemissive cells. The new photoconductive tube, called Vidicon by manufacturer Radio Corp. of America, can therefore be operated at much lower light levels, is simpler in design, and is much smaller than the standard commercial image orthicon.

The tube, now in advanced development stage, is 1 in. in dia. and 6 in. long. The photoconductive material is deposited on the transparent conducting signal plate and is scanned directly by the electron beam from the gun. A uniform magnetic field focuses the beam.

The 1-in. Vidicon, possessing a target sensitivity of 300 microamp. per lumen, will transmit a noise-free picture with a scene brightness of several foot-lamberts using an f/2 lens. This means that special lighting is not required.

The television camera unit employing this tube is only 10 in. long, 3 in. wide, and 5 in. high. It weighs only 8 lb. This unit is connected by cable to a master control monitor unit containing power supplies and sweep generators. On the camera, a motor mechanically focuses the lens.—Electronics, May, p70 and 168

Material Supply No Problem To Spun Glass Manufacturer

There is no raw material shortage problem for U. S. Glass Fiber Co. It uses broken glass—broken bottles, cracked windows, automobile windshields. The broken glass ends up as decorative spun glass, called "angle hair," which is used for decoration, as imitation snow, and as 40-in. wide flame- and fade-resistant glass fabric.

Glass is first rebroken into 2-in. pieces. Then it is pulverized. After melting, the glass drips onto a large steel drum spinning at 30 mph. This spinning draws the fiber into threads 1/12,000 in. in dia. Two hundred threads are spun at one time.—Business Wk, May 6, p38

Same Space, Triple Power

Carthage, Mo., municipal power plant began generating with diesel engines in 1921. A new diesel recently installed now stands on the same foundation originally put in for a 1924 unit, which it replaced.

The new unit turns out 3,600 hp.; the old one turned out 1,250 hp. Speed is up only 25%—from 180 to 225 rpm. The 1924 engine developed 49 bhp. per cu. ft. of cylinder displacement with a piston speed of 780 fpm. The new one develops 66 bhp. with a piston speed of 1 090 fpm.

Other advanced features that helped boost power three times for the same space requirement include trunk pistons, direct-driven scavenging blower, individual injection pumps for each of the nine cylinders.—Power, May, p100

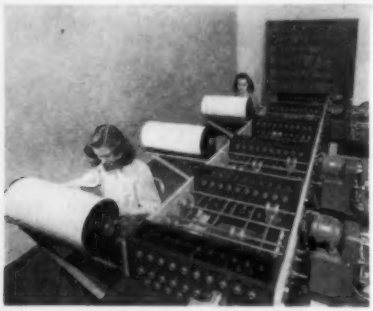
Show Features Cost Cutting

Tool show, hailed as an industrial cost-cutting exposition, saw many new gages, tools, and machines introduced to the metalworking industry

THE 1950 ANNUAL exposition of the American Society of Tool Engineers (Philadelphia on Apr 10-14) was regarded as the most successful tool show in the society's history. Much new equipment was shown for the first time.

A big attention-getter was Pratt & Whitney's first public demonstration of atomic energy applied to industrial gaging. The unit, designed in cooperation with General Electric Co., accomplishes continuous, non-contact gaging of strip material, whether wet, sticky, soft, or highly polished.

Known as the Beta ray gage, the device weighs a fixed area of the moving strip by radiation. It can be calibrated to read in percent deviation, weight per unit area, or decimal dimensions. Source of rays is radioactive strontium.



INEXPENSIVE ANALYZER

Built at National Advisory Committee for Aeronautics, this analyzer was made of war surplus parts and cost only $5,000. It consists of five mechanical integrators of a type developed by Lord Kelvin in 1876, torque amplifiers to drive the mechanism, three revolving data drums, and interconnecting gears and rods. Data are fed to drums as plotted curve on acetate plastic sheet. As drum revolves, operator turns handwheel controlling a pen, thus tracing data curve and feeding to machine. Results appear on third drum.—Prod Eng, Apr, p151

An entirely new adjustable-spindle air gage was shown by Sheffield Corp. The gage has a capacity of 1-2¼ in. with a set of 12 cores and 2 blades. Contacts may be button, jet, or blade, and are adjusted by gage blocks in a master fixture. The indicating instrument is based on the standard Precisionaire.

Illinois Tool Works demonstrated its sharpening measuring machine for checking parallelism, runout, and the spacing and rake of gashes of hobs and cutters. Also shown was its Toolograph machine, which produces a graphic record of the exact location of the cutting edge of each tooth on a fine-pitch hob.

National Broach & Machine Co. showed its new type gear speeder (McGraw-Hill Digest, June, p54) for checking planetary gear drives for automobile transmissions.

National Jet Co. exhibited two new microdrilling machines. One machine can drill holes as small as 0.00025 in. in stainless steel. It has no chuck or spindle; instead, the drive pulley is attached to the drill shank, which runs in ruby or sapphire V-ways.

Airborne Accessories introduced the Dupliform form grinder. It incorporates tracer and diamond dresser in a dovetail slide, which can be removed and placed on a magnetic chuck to dress the tracer to the same height as the diamond.

Form grinding of die sections was demonstrated by Moore Special Tool Co., Inc., on its new No. 2 jig grinder. This unit features an angular and indexing device built into the main spindle. Speeds vary from 12,000-60,000 rpm.

Small tools exhibited included Scully-

Jones & Co.'s floating toolholder that provides unrestricted parallel float through 360°, thus eliminating bell-mouthing of holes. Davis Boring Tool Div., Giddings & Lewis Machine Tool Co., showed a complete new line of planer tools. These feature an adjustable backup plate for the toolbit.

A deep-hole drilling tool for automatics, shown by Boyar-Schultz Corp., breaks up chips by an oscillating action. This feature avoids withdrawing the drill to get rid of the usual long, stringy chips formed in conventional drilling.—Am Mach, May 1, p118

Kaiser-Frazer's Body Dies First Application in Autos

Kaiser-Frazer Corp.'s automobile die-making process is not new. But it is the first time the process has been used in the automobile industry. Process, using plastics and plaster, cuts four months from tooling time.

Kish Plastics Co. does the casting for K-F. Eliminated are the standard cut-and-try method of making templets and the slow, costly process of hand-carving mahogany dies. K-F engineers say the process produces a more accurate set of dies.

To start, a full-sized clay model of the car is made. A female plaster cast is made from the model. From this is made a mold as a master, plaster molds of each part being made from it. These are used to produce dies by Keller machine.

Process permits designers to check accuracy anywhere in the process. Plastic parts can be assembled on jig to check fit. Templets, from which body drawings are made, must be made as in standard process but are made directly from the plastic car.

No one knows what the process will save in dollars. But since tooling costs are one of the biggest factors in total cost, time saving represents a large amount.—Business Wk, May 13, p38

ELECTRONIC BASEBALL UMPIRE

American ingenuity gives the American national pastime a new practice devise. Three phototubes in the ground box scan the permissible shoulder-to-knee area at the proper width. The recording equipment shows the pitched ball as good or bad and also determines its speed. General Electric Co. developed the unit.—Electronics, May, p116

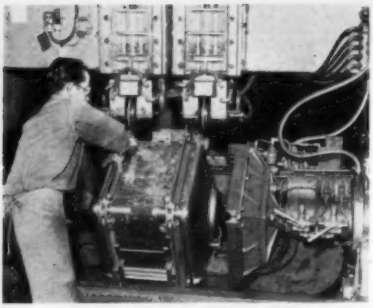
Building Power Line by Air

Stringing transmission line by helicopter has been proved practicable by Hawaiian Electric Co. About 25,000 ft. of ¼-in. steel "pulling-in" cable was laid over rugged country in less than 1 hour of flying time.

To lay this cable by conventional methods would have required 3 weeks to cut trails and another week to drag in the cable. Labor costs were reduced so a 60% saving was made, even after helicopter rental was paid.

The job was done this way: The helicopter would pick up the end of ¼-in. cable wound on a power reel and fly it to a tower on the next ridge, making two turns around the tower before dropping the cable.

A lineman would secure the ¼-in. cable to the ¾-in. winch line. At the other end, the power reel would wind it back, pulling the winch line with it. The winch line would then be employed to pull line conductors.—Elec World, Apr 10, p96



WELDS DISHWASHER TUBS

Hotpoint Inc.'s dishwasher tub consists of three parts—top, bottom, and sides and back. These parts are welded together in this National automatic seam welder. Parts are loaded into fixture, and start button is pushed. Heads move in to engage fixture and clamp parts together. Another pushbutton starts welding cycle. Tub assembly indexes and moves under wheel electrodes in three passes.—Steel, May 1, p94

Pest-Proof Package Wrap

An inexpensive, easy-to-handle, pest-proof wrapping material has been developed by the Pest Infestation Laboratory, Slough, England. It is cellulose wadding impregnated with DDT.

This material is suitable for wrapping small, individual packages packed in shipping containers. It should have a wide range of applications for packaging foods exported to tropical areas.

Wadding thickness ranges from 4 to 20 layers. Each layer is made of paper pulp spread so thinly that it constitutes a network of tiny holes and tunnels. The paper is slightly crimped so that if insects penetrate the carton they wander in the "labyrinth" and die before making any further penetration.

Other advantages of the material: wadding is flexible and does not have to be sealed around the packages.—Food Ind, May, p91

Synthetic Resins Bond Hardwood into Strong Paper

Offset papers from hardwoods may be the result of work at U. S. National Bureau of Standards. Synthetic resins (melamine-formaldehyde) substitute for the national fiber-bonding gel usually developed through use of a large amount of softwood pulps.

In making paper, pulp is beaten in water to gelatinize some of the cellulose. This usual practice affects adversely some properties neded for good printing quality. Using synthetic resins as a binder both minimizes the adverse affects and permits a reduction in beating time.

Up to 75% hardwoods has been used effectively. Beating time was 1½ instead of 9 hr. Each machine run was 50 lb. of pulp and 1% of resin size.

The resin was added as a colloidal solution to the paper stock just ahead of the head box where temperature was maintained at 90° F. Heat of drying cylinders completed polymerization of the resin, forming a water-soluble bond between the fibers.—Chem Eng, May, p218

Valve-Design Technique

New testing techniques in valve design can cut design time in half, lead to better valve performance, and avoid complicated formulas.

Edward Valves, Inc., studied its valve designs, not by working with actual valves but with symmetrical halves made of plastic. The plastic model is mounted in a steel box having the necessary fittings.

Compressed air is the test fluid. Density and pressure drop are measured. Also, the air flow can be observed during the test run by introduction of chemical smoke into the flow stream.

Although only half models are tested, good correlation has been obtained between models and actual valves of identical design.—Prod Eng, May, p102

Closer Production Control With Less Than Half Staff

Overhaul of production-control setup and procedure permits Reliance Electric & Engineering Co. to do a better job with less than half the former staff—19 now as compared with 39 a year or so ago. Objectives of the reorganization were to:

Improve delivery performance. Manufacturing cycle now ranges from 3 days to 3 weeks. It used to take 17 weeks.

Reduce inventory. Inventory of finished parts is 56% below the 1948 figure. Physical turnover has increased from 4½ to 6 times a year despite a drop in sales volume.

Cut order processing time. It used to take 2 weeks to process sales orders for the shop. It now takes 2 days. Goal—a day.

Reduce production-control costs. Personnel in the department has been reduced from 39 to 19. This cut was done despite a drop from 5 to 1.2 motors per order.—Factory, May, p82

Mix Speeds Road Widening

Unique system of widening an old 18-ft. wide pavement with asphaltic material proved highly successful on an 18-mi. stretch of Texas highway. Equipment used was standard, the job being too small to warrant purchase of equipment designed specifically for widening work. Road was widened to 24 ft. and resurfaced—for two-thirds of the stretch 3 ft. was added to each side and the rest was a 6-ft. strip on one side.

The new base was made 7 in. thick of hot-mix asphalt. Surface course was 175 lb. per sq. yd. of dense graded hot mix laid in two courses and placed with a spreader. As first step in widening, the shoulder was bladed back to a depth of 7 in. Window box was built and base material placed on surface of old concrete at outer edge.

A blade grader pushed mix into prepared space. A steel drag spread mixture. Earth was then graded against outer edge. Finally a conventional three-wheel roller compressed mix.—Eng News-Rec, Apr 20, p41

Electric House Heating

Novel house-heating system has been developed to try to make electric heating practical. Basically the furnace consists of conventional glass filter and fan for incoming air, plenum chamber, central heater, and duct heater for each outlet.

Each duct is equipped with a thermally operated damper. There are a thermostat in each room and a magnetic switch in the furnace for each duct heater. Each duct heater draws 3 kw., but demand of each drops as more heaters go on the line.

Good results were reported from tests. Installation cost was about 60% of that of conventional oil heating system. For an insulated house of 1,300 sq. ft., annual heating cost in Oregon runs about $100.—Elec West, Apr, p61

MICROWAVE SPECTROMETER

An outgrowth of radar, this spectrometer at Atlantic Refining Co. is being adjusted for analysis of hydrocarbon derivative contained in coiled rectangular wave guide at left. It distinguishes certain hydrocarbon derivatives from hydrocarbons themselves. Resolution is so great that there is room for 5-million non-interfering lines.—Oil & Gas J, Mar 30, p58

Motor Vibration Cured by Diagnosis, Treatment

Motors that vibrate need diagnosis, not guesswork. A good place to start checking is when the motor is being brought up to speed.

If vibration starts before motor is up to speed, the trouble is likely to be mechanical, such as unbalance or misalignment. If vibration is present after a synchronous motor is synchronized, the trouble then is probably electrical, such as a partially shorted winding.

In the latter case, the field windings is checked for shorted turns by the dc.-drop or ac. methods. The first test is easier to make but not as accurate as the ac. method.

The dc.-drop test consists of either measuring each field winding with an ohmmeter or applying less than rated excitation voltage across the collector rings and measuring the voltage drop across each pole with a voltmeter. In ac. testing, 120-volt potential is put across each pole and the current measured.

If the trouble appears to be mechanical, the first check is the motor footing for proper shimming, then the alignment of motor and driven equipment, the grouting and base installation, and the load for unbalance.—Oper Eng, May, p14

Why Not Articulate Buses?

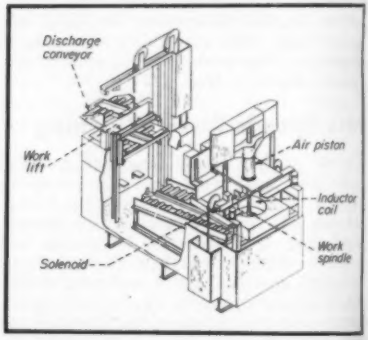
Increased room to move about it, rest rooms, lounges, and perhaps a snack bar seem valid reasons for increased bus revenue. These can be provided in an articulated bus. Width of bus is fairly well limited by road width. Height might be increased a few inches but not enough to provide the extra services. Length is the only feasible direction to expand.

Three years of testing of the Santa Fe articulated bus has proved the bus a success. Riding characteristics have been excellent. Swaying and leaning on curves have been reduced. Operating costs have been reasonable—5.3 mi. per gal. of diesel fuel.

A 60-ft. long articulated coach would carry 60 passengers in more comfortably spaced seats than now possible. Power for such a bus could be supplied by two diesels.—Bus Trans, May, p44

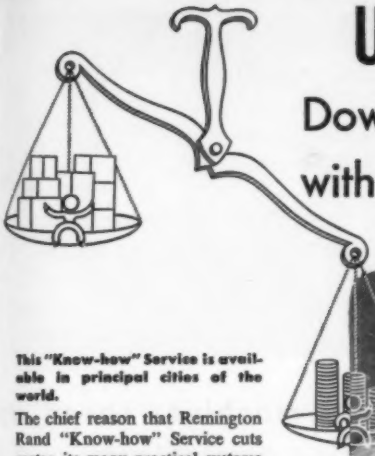
Calcium Chloride Fed to Mix

Exact amount of calcium chloride is automatically added to drum of a 34-E Ransome paver by a device designed and built by a Washington, D. C., contractor. A V-shaped hopper, holding 350 lb. of calcium chloride, feeds into a wedge-cut in a cylindrical container at the bottom. When the skip rises to drop aggregate into drum, an arm trips the cylinder and rotates it, dumping calcium chloride. As skip drops, cylinder returns for new charge.—Cons Meth & Equip, May, p47



AUTOMATIC HEAT TREATING

Tractor bull gears are heat-treated automatically at Ford Motor Co., Ltd., England, on this special-purpose unit. The gear, 18 in. in dia., is loaded on work spindle, heated by inductor coil, then quenched in oil below by solenoid-operated air piston. It slides on roller conveyor to other end of tank and there is raised to discharge conveyor by air-operated lift. Hardening temperature is 1560° F. Gear is withdrawn by lift at 400° F. temperature. Final hardness is 52 Rockwell C.—Mach, Apr 29, p637



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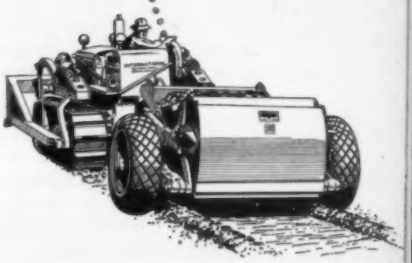

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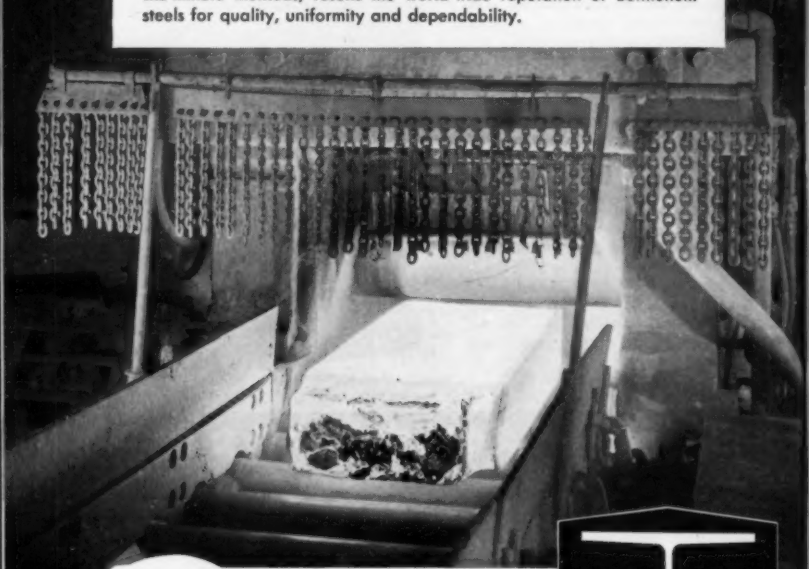

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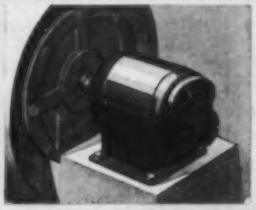

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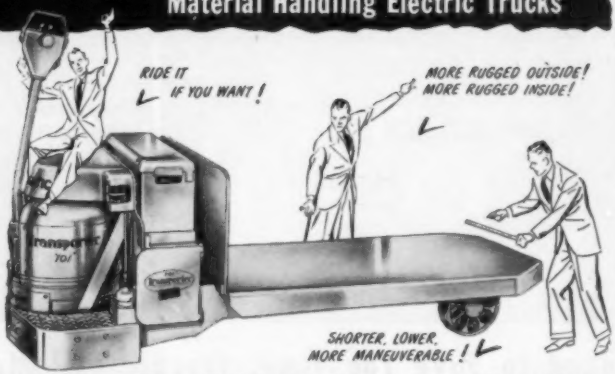

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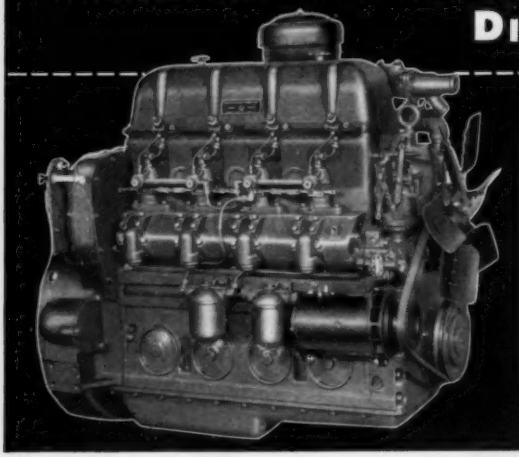

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